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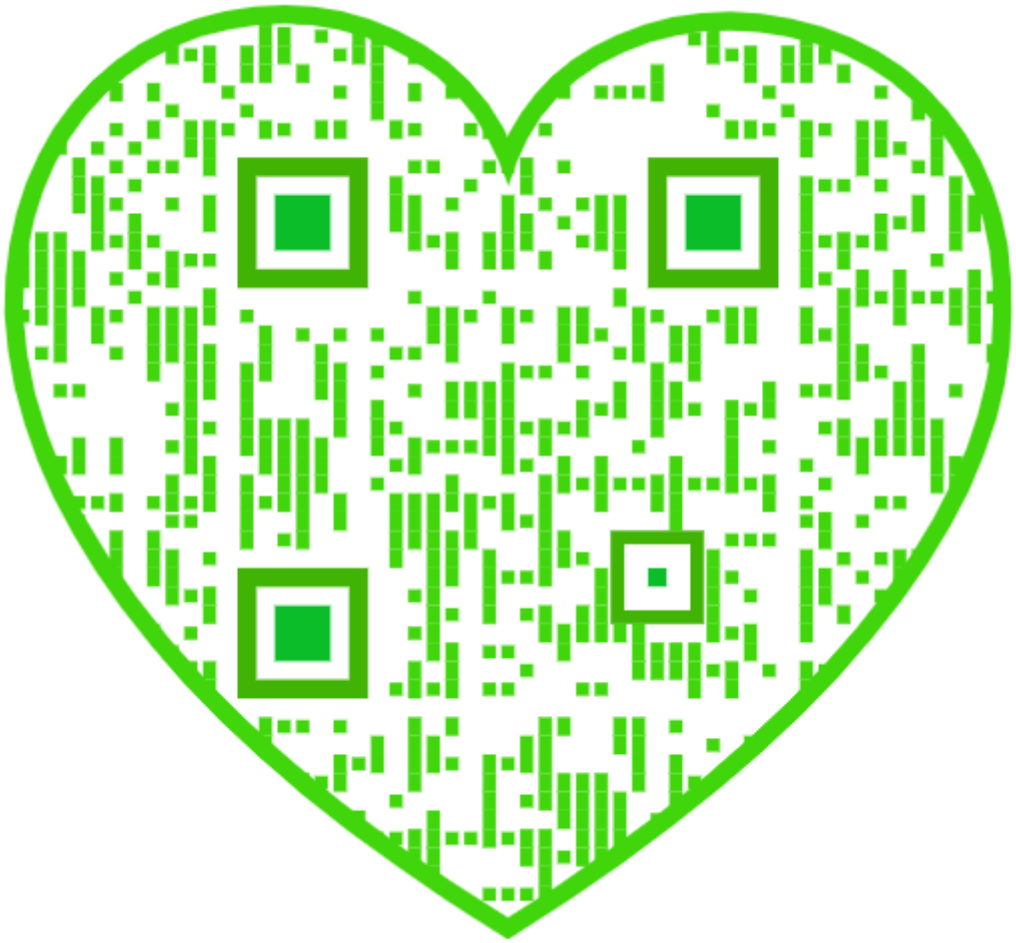

THE MODERN BAKER
CONFECTIONER AND CATERER

BUFFET FOR WEDDING RECEPTION

THE MODERN BAKER CONFECTIONER AND CATERER

A PRACTICAL AND SCIENTIFIC WORK
FOR THE BAKING AND ALLIED TRADES

EDITED BY

JOHN KIRKLAND

LECTURER AND TEACHER OF BREAD-MAKING NATIONAL BAKERY SCHOOL BOROUGH POLYTECHNIC INSTITUTE LONDON

WITH CONTRIBUTIONS FROM LEADING SPECIALISTS AND TRADE EXPERTS

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CHAPTER XXXIV

THE PREPARATION OF A BOAR'S HEAD

There are probably more historical associations connected with this "dish" than with anything else to be found on the table during the Christmas or ball-supper season. Old pictures remind us that it was popular in the reign of King Charles I, and the daily papers of the present day remind us that it is still patronized by royalty and at country mansions, while the dish is frequently required at public functions. It has its grades, of course, and it naturally follows that the average provincial caterer who goes in for the commercial boar's head can scarcely be expected to turn out an article precisely similar to that whose original owner may have roamed through the wild forest domains of the Kaiser. For our purpose we will fall back on our British-bred hog to supply us with the foundation at least of this most substantial and decorative *pièce de résistance.*

Commercial Boar's Head.

In the first place it will be necessary to obtain a pig's head cut as long in the neck as possible—3 or 4 inches away from the ears at least. If this weighs between 14 and 16 lb. it will make, when finished, a good average-sized head, about 18 to 20 lb. If possible, procure a head on which the nose is left intact; some slaughterers chop away the snout. Having procured a suitable head, proceed to bone it. This may be easily accomplished with a small butcher's knife by cutting the flesh from the bone, and commencing at the base of the skull to push the skin and meat over the ears. Extra care should be exercised at the top of the skull and down the forehead, as the skin itself should not be pierced anywhere. When the skull is freed from skin and flesh down to within about 4 in. of the snout, withdraw the skull as far as possible and saw through the remainder of the snout and under jawbone, and the head will then be ready for further preparation, with, of course, the snout left on.

Size of Head.

To Bone the Head.

Now make up a mixture of 5 lb. salt, 3 oz. crushed saltpetre, 4 oz. Demerara sugar, 1 oz. ground pimento, ½ oz. mace (ground), 2 cloves garlic, and a tablespoonful of fine-powdered marjoram. Rub this mixture well into the head, and lay it on an earthenware or enamelled-iron dish. Put in a very cold place till next day, piling up the superfluous salt, &c., on the head. The following day the head may be turned over and the rubbing process repeated, and should the weather be cold it may be rubbed in this way about every forty-eight hours until it has been in the salt for about ten days. Should, however, the weather be mild or changeable, it will be as well to immerse it in liquid brine after the first day's rubbing, as this will guard against all risks. The brine may be made as follows. Take about the third of a bar of salt; place this in a deep tub or earthenware pan, and pour on suf-

Dry Pickle.

Pickling in Brine.

ficient cold water (probably about 2 gal.) to make a brine strong enough to cause an egg to float; add to this ½ lb. of Demerara sugar and 6 oz. of saltpetre, either pounded very fine or dissolved in 1 pt. of hot water. The head may be placed in this, with a weighted board or flat stone to keep it down, and left for about eight days, when it will be pickled sufficiently for further preparation.

Before the pickling is completed, however, have ready the following: one boiled ox tongue, a piece of fat bacon about 1 lb. in weight, a pint tin of champignons, a small bottle of truffles, 2 oz. pistachios, 2 cloves of garlic, a bunch of parsley, marjoram, 2 eggs, 6 lb. very fine sausage meat or 5 lb. pork to make same, salt, pepper, ground mace or nutmeg. Should the operator decide on making his own sausage meat, it is only necessary to cut up the pork in small squares and grind through a mincing machine. This meat may be weighed, and one-fourth of its weight in bread may be added. The bread should be soaked in cold water for about twenty minutes, and then squeezed in a cloth to extract all superfluous moisture. It should then be thoroughly mixed with the meat and ground through with it twice if necessary. The seasoning should consist of 4 oz. salt, 1 oz. ground white pepper, ½ oz. nutmeg, ½ oz. ground mace.

Stuffing for Boar's Head.

Seasoning for Force Meat.

Before stuffing the head it will be necessary to procure a good strong cloth to tie it in. This should be quite 36 in. square, and, if it has to be purchased, the material called Holland linen is the most suitable. This, of course, should be well washed in several waters before using. Several yards of strong tape or twine, preferably the former, will also be required for tying up.

Covering to Boil in.

Having got all the foregoing articles ready, take the head from the brine, and after allowing to drain off some minutes, wipe it well with a dry cloth and proceed to cut off the ears very carefully and with plenty of "root" to them, as we do not boil them full time with the head. Take every particle of bone from the ox tongue, and cut off the tip and superfluous part of the root. The tip of the tongue may be cut in cubes about ¾ in. square (also the fat bacon), the champignons sliced, and the parsley chopped finely, the truffles cut in small pieces, and the garlic chopped exceedingly fine. When all these are ready, place the fine sausage meat in a large mixing-bowl; break in the eggs and add the seasoning, chopped parsley, garlic, and about a dessertspoonful of fine-powdered marjoram; then all the other ingredients, reserving, of course, the ox tongue. Spread out the cloth to its full extent, and place the pig's head on it with the nose in the centre and pointing to one of the corners. Slightly flour the inside of it to cause the sausage meat to adhere more readily, and push some of the mixture into the interior with some force. Repeat this till it is nearly all in. At this point the ox tongue may be pushed into the centre with its tip towards the pig's nose, and, when that is in, the remainder of the farce or sausage meat may be added. The head should now assume something of the shape of the original, without

Cutting the Ears.

BOARS' HEADS

the ears, of course, which must be left out. Having got all the meat in, place a common dinner plate on this to keep it in position, and proceed to reach over the head and draw the farther point of the cloth towards you over the snout and forehead so as to meet the point nearest you. Now gather up the right and left corners of the cloth and pull them tightly across the head, gathering all four corners together, and holding them tightly to keep the plate in position. Tie these four corners securely together at the back of the plate, leaving a strong loop in the twine for a purpose to be explained later.

Tying up the Head.

If a needle and strong thread are handy, it will be as well to stitch up folds of cloth down the pig's forehead; and, to make all more secure, the head may be tied round tightly with tape to keep it in as good a shape as possible.

If the pot in which this is to be boiled is not quite ready, an ordinary butcher's S hook may be put through the loop, and the head hung somewhere, nose downwards. If a large common stock pot is available, the head may be boiled in stock for about six hours. In lieu of this, water will have to be the medium, and it should always be at boiling-point; there should be plenty of room for the head. Two or three sliced onions, carrots, a pinch of thyme, and a few pimentos, with odds and ends of celery, should also be added. The head should now be carefully lowered into the boiling liquor, and when it has boiled gently for about three hours should be carefully turned completely over and allowed to complete the six hours.

Boiling in Stock.

Boiling in Water.

While this is going forward, the ears may be tied on the end of a piece of twine and dropped in at the side of it. These will only require cooking for about forty-five minutes to one hour, when they should be lifted out and placed carefully on a dish (back downward) with two weights placed on them so that they will set in a good shape for further use. When the head is cooked sufficiently, insert a meat hook in the loop of twine at the base. Lift out and hang it in some cold place till the following day, when it should be set sufficiently for further manipulation. In the meantime procure a pair of glass eyes and a pair of tusks from the taxidermist if there are none in stock.

Cooking the Ears.

Head allowed to Set.

All being ready, take down the head and damp the cloth slightly with warm water, and proceed to remove it very carefully. The head, being minus its ears, will show little indication at this stage of what it is to be. Remove the plate and trim round the farce at the neck part, and with these trimmings and any odd pieces of tongue or ham in the larder add about 6 or 8 oz. butter. Grind this finely through a mincing machine. Now examine the head from the front, and with the point of a knife make two incisions for the placing of the ears. Fix these in with short wooden skewers, and complete the joints with the farce. The snout may also be moulded up with this medium, and the head made as correct in shape as possible by its use after the manner

Farce for Moulding.

Moulding the Head.

of a sculptor with his modelling clay. Smooth all down with the blade of a knife which has been dipped in boiling water.

Method of Glazing.

It will then be ready for glazing. This should be done very carefully, with about three coats, and when it is completed cut out the sockets for the eyes, which may be set in with a little of the farce, and incisions may also be made for the tusks. The head is now ready for piping in butter (see Chapter III, Vol. II), and may be further embellished with hâtelette skewers, aspic jelly, or a wreath of holly, according to the exigencies of the occasion. (See the plate.)

Placing Eyes and Tusks.

Piping Figures, &c.

CHAPTER XXXV

VEGETABLE AND FRUIT SALADS

In nearly every month of the year there are in season various kinds of lettuce and other edible plants, such as French beans, broad beans, asparagus, cucumber, beetroot, radishes, tarragon, chervil, garlic, onions, endive, watercress, cauliflower, dandelion leaves, and parsley, that are suitable for salads. People in this country do not consume these "green meats" to anything like the extent of Continental people. The demand, however, appears to be on the increase, and for outdoor functions or for the restaurant trade in hot weather nothing is quite so suitable as properly prepared salad. Any kind of salad mixed with Lucca oil, a small quantity of vinegar, and the necessary seasoning is wholesome and very refreshing. Fresh vegetables only should be used. These must be thoroughly cleansed in cold water (to which a little salt has been added), then drained in a colander and dried on a cloth. The vegetables should not be left in the water too long, as they lose flavour and that crispness which is essential in a good salad. To remove all water from the salad, close the corners of the cloth containing it so as to form a bag, and swing this backwards and forwards. When preparing endive and lettuce for some varieties of salad, these should not be cut with a knife, but pulled apart in pieces with the fingers.

Salad Vegetables.

Salad Dressing

Before dealing with the several varieties, instructions are necessary as to the method of preparing plain and rich salad dressing. Lucca oil is the principal ingredient in either mixing, and if this is blended judiciously with the other materials the full flavour of the salad will be brought out. For the plain dressing use two and a half tablespoonfuls of oil to one spoonful of vinegar, a little salt, fresh-ground pepper, and mustard. Place the vinegar in a small basin or in a salad bowl; then mix in the seasoning, add

Oil for Salad.

Plain Dressing.

the oil, and stir all together. It is then ready for use. No dressing should be added to the salad until it is about to be served.

For a rich dressing prepared with mayonnaise, place in a clean, cold basin two yolks of egg; add a little dry mustard, salt, and pepper; mix all together with a spatula, and while stirring drop in gradually about 1½ gill of Lucca oil. Continue mixing until it has a firm appearance, quite smooth, like butter cream; then add a few drops of vinegar, with a little lemon juice. It will then be ready for thinning down with cream and tarragon vinegar to form the dressing. The writer has used a very small portion of castor sugar with this dressing and has found it satisfactory. Dressing thus prepared may be kept for several days in the larder, stored in corked bottles. Another kind of dressing may be prepared by passing through a fine sieve some hard-boiled yolk of egg, and mixing with the oil and vinegar as for plain dressing.

Rich Salad Dressing.

Sugar in Salad Dressing.

Potato Salad

To make a salad of potatoes, obtain small kidney potatoes early in the season; cook thoroughly without breaking, and when quite cold cut into slices. Prepare a plain dressing; add some chopped parsley, a little onion chopped very fine, and mix all together. The potatoes should not be broken during the mixing. Sprinkle some parsley over them before serving.

Plain Green Salad

Another plain salad may be prepared with cabbage or cos lettuces. Wash and dry the best parts; break into small pieces, and mix to plain dressing with which chopped tarragon and onion have been mixed. Lay on the top a few small pieces of bright-coloured beetroot and four or five pieces of hard-boiled egg cut into quarters.

Garnishing Salad.

French Salad

French salad consists of a mixture of lettuce, endive, a little mustard and cress, tarragon, chervil, and the whole mixed with plain dressing to which hard-boiled yolks have been added. This may be decorated with beetroot, cucumber, tomatoes, and hard-boiled eggs as required.

When eggs are used for these salads, care should be taken to keep them a good colour. Procure some fresh eggs, boil them for ten minutes, and allow them to remain in cold water until required. When tomatoes are used they should be quite fresh. It is advisable to remove the skin. This may be done by dipping them in boiling water and peeling with a sharp knife.

Keeping Eggs Bright.

Skinning Tomatoes.

French Spring Salad

French spring salad is composed of dandelion leaves, lettuce, some leaves of Indian corn, finely chopped onions, the whole mixed with plain

dressing with which chopped tarragon and a little mint have been mixed. Small potatoes and tomatoes cut into slices are an improvement to this salad. Some varieties of these plain salads are decorated with beetroot, cucumber, and tomatoes, cut in slices and made to represent some fancy design. Small pieces of hard-boiled eggs are also arranged on top. Radishes may be mixed with either of the above salads. These should be small, quite fresh, and used whole or cut in slices.

Radishes.

Fig. 141.—Vegetable-slicing Machine

Plain Cucumber Salad

Plain cucumber salad, as generally served with cold salmon, is prepared as follows. Remove the rind from a fresh cucumber, cut this in thin slices, lay on a flat dish, and sprinkle some salt over. Allow this to remain for thirty minutes, then drain off what water has exuded from the vegetable, and pour some oil over and a little vinegar. Season with salt and pepper, and it is then ready to serve.

Tomato Salad

Tomato salad is prepared by mixing with slices of tomatoes a plain salad dressing made with salad oil, vinegar, finely chopped tarragon, and onions. Before serving sprinkle some chopped parsley on top. Some prefer to mix thin slices of Spanish onions with this salad, but this is according to taste.

Chopped Parsley and Spanish Onions.

German Salad

Many kinds of cooked vegetables are used for German salad. There are several recipes which may be adopted. Prepare some small Brussels sprouts, some pieces of cauliflower, sliced cold potatoes, some broad beans, and dress with parsley, oil, vinegar, and seasoning. More vinegar is added to this salad than is used for the others already referred to. The writer has seen slices of apples used for garnishing, but there does not appear to be a set rule for this mixture.

Apples in Salad.

Macédoine Salad

To make a Macédoine salad, prepare and cook the following vegetables: French beans, carrots, turnips, green peas, white pieces of cauliflower, haricot beans, and asparagus tops. Before cooking the turnips and carrots they should be cut into small dice-shaped pieces. Drain these on a cloth, then mix with rich dressing made with mayonnaise and cream. Arrange all carefully in the salad bowl or dish, and ornament with pieces of various-coloured vegetables. Prepared Macédoine of vegetables, sold in tins or bottles, may be used for this salad; these

require to be rinsed in water before using, especially those preserved in tins.

Russian Salad

Russian salad is similar in some respects to that just referred to. It also consists of a Macédoine of vegetables, with the addition of pieces of ham and tongue, cut into small dice shapes, and mixed with prawns or tails of crayfish. Place in a basin some small pieces of cooked vegetables, such as green peas, French beans, turnips, carrots, and asparagus tops; add to these some pieces of gherkin, small capers, beetroot, ox tongue (cut from the tip), and a few prawns and crayfish tails. Mix all together with mayonnaise and raise to a pyramid on the centre of a silver dish. Decorate this with alternate layers of various-coloured vegetables, stamped out with a ½-in. plain cutter. Each colour should form a ring round the salad. Finish the top with a few prawns or crayfish tails. Another style of serving this salad is to make a border mould of aspic jelly and vegetables. This is turned on to a round or oval silver dish, and the salad raised pyramid-shape in the centre. When required, Russian caviar may be used in the decoration by pressing pieces together and laying them round the base.

Ham and Tongue.

Prawns and Crayfish.

Caviar.

Lobster Salad

Lobster salad is another popular dish. This is a special favourite among the various items prepared for supper parties. It may be served in salad bowls or on glass dishes, but is more attractive when neatly arranged on round or oval silver plates. Prepare as follows. Divide into pieces of convenient size some freshly washed and dried lettuce and endive, and season with salt and pepper. Raise this to a pyramid on the dish. Remove the meat out of a fresh lobster; cut it into slices and lay the pieces on top of the salad. Cover this with mayonnaise, spread on with a palette knife. Garnish the base with a border composed of pieces of small round slices of beetroot and cucumber, arranged so that one slice overlaps the next. Arrange in position a border of cut cucumber on the side of the dish, with quarters of hard-boiled eggs, and sprinkle over the mayonnaise some coral which has been passed through a fine wire sieve.

Italian Salad

Italian salad is composed of a mixture of buds of cooked cauliflower, French beans, Brussels sprouts, green peas, and haricot beans, to which may be added pieces from the breast of a fowl, or any kind of game or other meat. Mix all together, without breaking the vegetables, with mayonnaise sauce, to which have been added some chopped gherkins and tarragon. Raise this on a silver or glass dish, and garnish with farced olives. Neatly arrange some pieces of bright-coloured beetroot,

stamped out with a plain ½-in. cutter, on the top of the salad, together with a few capers.

Fish and Meat Salads

With many salads, as prepared on the Continent, various kinds of fish, such as anchovies, pickled herrings, sardines, shrimps, and crayfish are added. In addition to these, poultry and game, also various kinds of smoked sausage and fresh-cooked meat, are used. It is not advisable to mix these or any other salads with the dressing until required for the table, as they lose their fresh appearance quickly when saturated with the oil.

French Method of Salad Dressing

The French style of preparing salads may be adopted for many of the other Continental dishes referred to, by changing the principal ingredients. Cut four anchovies into very small pieces, from which all bones have been removed. Prepare a very small piece of garlic, and chop this very fine with some parsley, a small onion, and one shallot. Place these into a salad bowl; season with salt, pepper, and French mustard; add the oil and vinegar and mix thoroughly. Drop in some pieces of cold roast fillet of beef or other kind of meat. Sprinkle over it some chopped tarragon or parsley, and serve plain, or decorate with pieces of beetroot or potatoes, previously pickled in vinegar.

Fruit Salads

Fruit salads are made with fresh or bottled fruits, cut into small pieces, mixed with syrup and various liqueurs, and iced prior to serving.

Iced Macédoine of Fruits

Iced Macédoine of fruits is the queen of these salads. During the summer months, when varieties of fresh fruits are obtained at small cost, this is in great demand for luncheon, supper, and other parties. It may be served in salad bowls or in silver dishes, and a mould of rich lemon water ice placed on the centre of each. The writer has used small timbales made with rich, short paste, the borders decorated with sugar liqueur rings of various colours, for serving this salad. These were useful as well as attractive, especially for hotel and restaurant trade. Prepare as follows. Place some apple jelly in a shallow pan and mix with clear stock syrup. Add some small, ripe strawberries, pieces of bananas, peaches, pineapple, apricots, pears, greengages, and black and white grapes. Flavour with two or three wineglassfuls of maraschino; turn all into a freezer, place in a tub and charge with plain ice. Allow to remain three or four hours before sending to table.

Timbales for Fruit Salad.

When the price of fresh fruits does not permit of these being used, add preserved cherries, or pieces of apple previously cooked in red syrup, with tinned or bottled apricots, pears, and peaches.

Use of Tinned Fruits.

Orange Salad

To prepare a salad of oranges, choose some sound fruit, and remove every particle of the rind with a sharp knife. Remove the fillets of the oranges, leaving out the pips and inner skin. Place on a china or glass compote stand and cover with a little stock syrup and sufficient curaçao to flavour.

Cherry Salad

To prepare a salad of cherries, remove the stones from some bright-coloured fruit, and bring this to the boil with some syrup, the rind of a lemon, a few bay leaves, and a small piece of stick cinnamon. Drain off the syrup; place the fruit on a dish or salad bowl; sprinkle over it some noyau, and add part of the syrup in which the fruit was cooked. Boiling in syrup is necessary only when the fruit is not soft or sufficiently ripe.

Banana Salad

Salad made with bananas should not be prepared until required for serving, as the fruit changes colour quickly. Cut into small pieces and serve with syrup flavoured with a little noyau and maraschino or kirsch-wasser.

Pear Salad

Stewed pears and port wine are served mostly as a dinner sweet. Remove the rind from some well-shaped pears. Cut in halves, remove the core, and simmer gently in weak syrup containing some carmine, a few bay leaves, and pieces of stick cinnamon. When the fruit is cooked through, remove the pieces to a basin and reduce the syrup by further boiling; then add to it some red-currant jelly. Strain this mixture on to the fruit. When quite cold, and just before sending to the table, add a little port wine. This fruit, if iced, is a favourite dish at ball suppers, &c.

Whipped Cream and Strawberries

Iced whipped cream and strawberries is prepared as follows. Beat some double cream quite firm, and sweeten with fine castor sugar. Mash the strawberries and mix with the cream; place in a freezer charged with plain ice, and when thoroughly cooled and firm serve on small ice plates or in paper cases. The fruit should not be mashed into pulp, but only broken into small pieces.

CHAPTER XXXVI

VEGETABLES FOR GARNISHING AND SECOND-COURSE DISHES

Boiled Potatoes

It is not a bad test of a cook's knowledge and carefulness when simple boiled potatoes are always turned out satisfactorily. In restaurant kitchens there are usually suitable appliances for cooking the potatoes by steam, but they may be cooked quite as satisfactorily with care by boiling in water. Wash the potatoes carefully, and if they are to be cooked in their skins, it is better to scrub them to get the mould out of the eyes. Otherwise, pare and place them in a suitable saucepan with enough cold water, in which a piece of salt is dissolved. Boil the water until the potatoes are sufficiently cooked; the average time required to cook them after the water is boiling is about twenty minutes, but the time varies according to the size of the potatoes and their kind. Some sorts need very careful watching, as, unless they are strained at just the right moment, there is a danger of their breaking up and becoming watery.

New Potatoes

When potatoes are quite new the skin is so thin that it can be readily scraped off, after the potatoes are washed. They are cooked in the same manner as old potatoes by boiling or steaming, but as they are smaller than old potatoes the time required may be a little less, unless the new ones are of the waxy sort, when they require longer cooking. After they are done and strained a piece of butter is added, and some raw spring onions, chopped small, well mixed with them, and the whole nicely seasoned with pepper and salt.

Mashed Potatoes

When potatoes are required to be mashed they should be carefully cooked to a mealy state. The potatoes are then broken up until quite smooth and free from lumps, and a little salt butter and milk or cream added, with sufficient pepper and salt to season nicely, and the whole beaten with a fork until of a light creamy consistency.

Potato Balls

When a quantity of boiled potatoes is left over, there is no better way in which they can be advantageously used up than in the form of potato balls. The cold potatoes are passed through a fine sieve, as they cannot easily be mashed to smoothness except when they are newly cooked. After they are passed through the sieve they may be further mashed to render them as smooth as possible. About 1 oz. of butter for each pound of potatoes is added, and sufficient milk or cream to make the mixture of a firm consistency. About one egg is added as the binding agent and the whole

mixture beaten light. They are then moulded with a spoon or in the hand to any desired shape and size, washed over with egg, and rolled in bread raspings. They are then cooked in a saucepan containing sufficient depth of fat to keep the potato balls off the bottom of the pan, or in a wire basket which fits into the saucepan. When cooked to a golden brown they are served up, either quite dry or along with brown gravy in a sauceboat.

Chip Potatoes

In the restaurant business, especially in establishments where chops and steaks are the only hot dishes served, potatoes are more often asked for in chip form than in any other. There are two forms of chipped or fried potatoes in common request. One form is for the potatoes to be sliced in round very thin leaves about the thickness of a shilling, and cooked in hot fat to a golden brown and until quite crisp, and then with a little fine salt sprinkled over. After cooking, the potatoes should be drained well before the fire or in a hot cupboard to remove as much of the adhering fat as possible. The other and much more common method of serving fried potatoes is in oblong pieces cut by hand or in a small machine (fig. 142). The potato can be cut longways into say eight pieces, and fried in the usual way as described above, drained, and sprinkled with salt. Successful frying of potatoes depends on the fat being perfectly clean and sufficiently hot. The pan containing the fat should be cleaned out daily; fat of sweet or neutral taste should always be used, and it is better always to fry the potatoes in a frying basket. If the fat is bubbling up it is not ready, the bubbling being due to the water it contains boiling out. The fat when hot enough should appear quite still, but hisses violently when a few drops of water are thrown on it. Potatoes cooked in fat too cold will not colour nicely, are tough, and taste greasy. When the fat is sufficiently heated they are of a nice golden brown, crisp, and free from the least taste of greasiness.

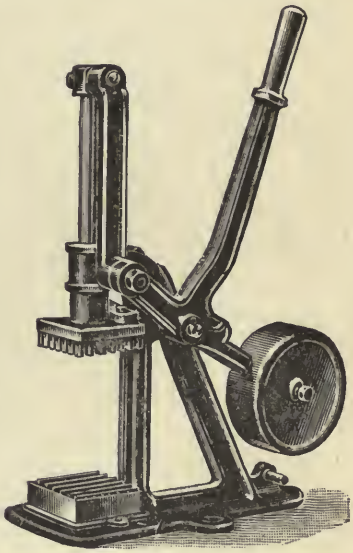


Fig. 142.—Chip-potato Machine

Potatoes à la Maître d'Hôtel—Pommes de Terre à la Maître d'Hôtel

Small French kidney potatoes are best suited for this dish. Prepare them in the usual way, and when ready cut them into slices about $\frac{1}{6}$ in. thick; put them into a saucepan with a little white sauce, a little butter, a few drops of lemon juice, and a little seasoning of salt, white and cayenne pepper. Toss them over the fire until all are mixed; then transfer to a

silver or china dish; sprinkle over them some chopped parsley, and serve with small croûtons placed round.

New Potatoes, with Cream—Pommes de Terre Nouvelles à la Crème

Cook some new kidney potatoes, cut into slices, put them into a saucepan with some fresh cream, seasoning with a little grated nutmeg and a few drops of lemon juice. Toss them over the stove without breaking the vegetables; transfer to a dish; sprinkle a little chopped parsley on top; arrange in position some small croûtons of fried bread, and serve while hot.

Stewed Green Peas—Petits Pois

Put 1 pt. of peas into a stewpan with sufficient boiling water to cover; add a small faggot of mint, a little parsley, and one small onion; stir in one teaspoonful of sugar and 1 oz. of fresh butter, also a little salt. The peas should not be overcooked. When ready, strain off the liquor, add a little clarified butter to the vegetables, turn out and dish with small croûtons placed round.

Peas, French Method—Petits Pois à la Française

Prepare the peas as directed above, with only sufficient water to cover; add a small piece of soda and extra sugar. When cooked, strain off the liquor, and add to the peas a small quantity of light-coloured glaze—a piece of butter previously mixed with some flour. Toss all together over the fire without damaging the vegetable, and serve with croûtons placed round.

Glazed Turnips—Navets à l'Allemande

Turn about one dozen turnips into the form of rings about 2¼ in. in diameter, put them into a sauté pan, thickly spread with fresh butter, and sprinkle over them about 1 oz. of castor sugar. Add 1 gill of strong consommé, and set the vegetables to simmer gently over a moderate fire for about thirty minutes. When these are nearly cooked, remove the lid and place them over a brisk fire to finish cooking, and to reduce the liquor down to glaze. Gently roll the turnips in this, with great care to avoid breaking them. Dish on a silver dish, and pour the glaze over them. The quantity of consommé required for the above purpose will depend upon its quality, as well as on the thickness of the vegetables.

Glazed Carrots—Carottes à l'Allemande

Take the required quantity of young carrots and trim them so as to make all of equal size. Parboil them in water, with a little salt, for about fifteen minutes; drain them on a colander or hair sieve, and immerse them in cold water. After they have been in the cold water for twenty minutes, drain them again, and lay them on a cloth. Next place the carrots into a sauté pan with some fresh butter, a little castor

sugar, and some strong consommé. Set the vegetables to boil over a steady fire, then over a brisk fire until cooked and the moisture is reduced to glaze. Turn out on a hot vegetable dish, and pour round them some Allemande sauce (see vol. ii, p. 87) mixed with some parboiled chopped parsley.

Vegetable Marrow

Cut the marrows according to their size into suitable pieces, and place them in a deep sauté pan, thickly spread with butter, and season with salt, pepper, and a little castor sugar. Moisten with some white stock, and set to boil gently over a steady fire for about fifteen minutes; then boil briskly until the liquor is reduced to a glaze. Add some Espagnole sauce (see Vol. II, p. 82) to the glaze, and a few drops of lemon juice; mix all together, and pour out on a dish without spoiling the shape of the vegetable.

Another method of preparing vegetable marrows is to boil them in water with seasoning; then strain, and serve with a rich white sauce.

Asparagus—Asperges

Prepare the asparagus for cooking by scraping the stalks clean, washing them in cold water, and tying up into bundles of about twenty in each. Keep the heads one way, and cut the stalks even so as to have them about 8 in. in length Put the asparagus into hot water, with sufficient salt to season, and boil for about twenty minutes. When ready, strain them on a cloth, taking care not to break off the heads. Place a piece of toasted bread into the bottom of a dish, lay the vegetable on top of this, and serve with white sauce or hot clarified butter.

French Beans, with Suprême Sauce—Haricots Verts à la Maître d'Hôtel

String some fresh beans, shredded into small pieces. Wash them in plenty of water, drain, and turn them into a pan of boiling water; add some salt, and boil them briskly until they become tender. Drain them in a colander, then upon a cloth to absorb all the moisture. Place into a saucepan a small quantity of suprême sauce (see vol. ii, p. 87), with 2 oz. fresh butter, 1 tablespoonful of chopped parsley, the juice of half a lemon, and a little seasoning. Stir these well together over the stove, and when ready, throw in the beans, and toss all together over the fire until ready for serving. Where so desired a border of fried croûtons may be dished with the beans.

Another method of preparing these beans for the table is to mix them when removed from the boiling water with a hot mixture, consisting of chopped shallots, a little nutmeg, pepper, and salt, the juice of a lemon, fresh butter, and chopped parsley. The beans should be tossed over the fire with the above ingredients before serving.

Broad Beans à la Crème

Beans for this purpose must be young. Boil them in plenty of water containing some salt and a small faggot of parsley and onion. Drain them in a colander, and put them into a saucepan with some fresh butter, a little chopped parsley, salt, pepper, and grated nutmeg. Toss them over the fire, and add some white sauce before serving.

Cucumber, with Espagnole Sauce—Concombres à l'Espagnole

Prepare some pieces of cucumber about 1½ to 2 in. long; trim them round and smooth at the ends, and remove the skin and seeds. Parboil them in water and salt for five minutes, and then drain on a cloth. Fill each piece of cucumber with some quenelle forcemeat of chicken (see Vol. II, p. 124); then arrange them in a sauté pan, lined with thin layers of fat bacon; cover also with bacon; add a little consommé, and set them to simmer gently over a slow fire for about twenty-five minutes. When quite tender, dish them in pyramid form, and pour over them some bright Espagnole sauce.

Cucumber, with Velouté Sauce—Concombres à la Poulette

Prepare some pieces of cucumber cut into small scallops about 1¼ in. long, place in a basin, and sprinkle over them some salt and vinegar. Allow these to remain for three or four hours; then drain off the liquor, and finish as follows. Put the cucumber into a sauté pan with some fresh butter, a little crushed mace, and a tablespoonful of sugar, and allow these to simmer over a slow fire until quite tender. Drain off what liquor is in the pan, place the cucumbers on a dish, and pour over them some velouté sauce (see Vol. II, p. 82) to which has been added some chopped parsley and lemon juice.

Tomatoes, with Italian Sauce—Tomates à la Provençale

Take some sound English tomatoes, and select them as nearly as possible of the same size; cut off the lower part that adheres to the stalk; scoop out the seeds without breaking the fruit, and finish as follows. Chop together a handful of parsley, some mushrooms, and two or three shallots; put these into a stewpan with 2 oz. of fat bacon; season with pepper, salt, and thyme. Fry these over the fire for several minutes, then add four yolks, 2 or 3 oz. of bread crumbs, and finish cooking. Then remove this mixture, and use for filling each tomato. When the fruit is filled with this preparation, sprinkle some raspings of bread over each. Prepare a sauté pan containing a little hot salad oil, lay the forced tomatoes in this, cover with a round piece of buttered paper, and bake them in a hot oven. When ready, dish up in the form of a dome, and pour over it some Italian sauce (see Vol. II, p. 82).

Forced Mushrooms—Champignons au Gratin

Prepare some mushrooms by removing the skin and stalks, trim the edges, then fill each mushroom with a preparation similar to that prepared for Tomatoes à la Provençale. Sprinkle some raspings over each, place into a sauté pan previously covered with a layer of fresh butter; cover with buttered paper, and bake in a hot oven for about fifteen minutes. Dish them up in pyramid form, and pour some Italian sauce over them.

Cauliflowers—Choux-fleurs

Choose those cauliflowers that are close and white. Trim off some of the leaves, taking care that there are no caterpillars about the stalk, and soak the vegetable for one hour in cold water. Boil them in milk and water, or water only, until they are tender; then remove, drain on a sieve, and serve with a white sauce poured over the cauliflower. To keep this vegetable of a good colour it will be advisable, while boiling, to remove all scum as it rises to the surface.

Cauliflower with Cheese—Choux-fleurs au Gratin

Prepare and dish up the cauliflowers as directed above. Put ½ pt. of velouté sauce into a stewpan; add 3 oz. of Parmesan cheese and a little fresh butter, three yolks, a little nutmeg, pepper, and salt, with a few drops of lemon juice. Stir this mixture over a steady fire until it becomes quite hot,—but do not allow to boil. Smooth the dish of cauliflower over with a knife, and mask it entirely with the preparation. Sprinkle over it some grated Parmesan cheese, and place the dish into the oven for about fifteen minutes. Remove when the contents have acquired a light-brown colour.

Celery—Céleri

Wash six heads of celery, and strip off their outer leaves. Either split into halves or leave them whole, according to their size; cut into lengths of about 4 in Put the pieces into a stewpan with a cup of broth or weak white gravy. Stew until tender; then add a little white sauce, season, and allow all to simmer for a few minutes.

Celery, with Espagnole Sauce—Céleri avec Sauce Espagnole

Trim a few heads of celery; wash, and cut them about 5 in. in length. Parboil them in water for about ten minutes, and then steep them in cold water. Drain on a sieve, then place them into a stewpan with some Espagnole sauce made rich, and allow to cook until quite tender for serving.

Another method of finishing the celery after parboiling, is to braize it in a pan of clear-coloured glaze, and serve it on a very hot dish.

Vegetables for Garnishing

When preparing vegetables for garnishing purposes it is necessary to keep them as nearly as possible of one size. After being parboiled it is the usual practice to sauté them over a steady fire in clear-coloured glaze, or in a rich sauce, either white or brown, according to the variety of vegetable. Sometimes it happens that two or more kinds of vegetables are braized together; it is then necessary to have all the pieces about one size, and cooked just enough to make them tender without spoiling their appearance.

CHAPTER XXXVII

PUDDINGS AND SWEETS

Caramel Rice Pudding

Line the mould with a thin coating of liquid caramel prepared as follows. Dissolve 3 oz. of castor sugar in a small copper pan over a steady fire, and when it becomes a light-brown colour, pour it at once into a warm mould. The mould should be quite dry before using. By turning the mould round, the sugar will form a thin coating on the bottom and around the sides. Bring to the boil 1¼ pt. of milk, 2 oz. of castor sugar, the rind of half a lemon, a small piece of stick cinnamon, and two bay leaves. While the mixture is being stirred with a spoon, sprinkle in 2½ oz. of ground rice, and cook the whole for eight minutes. Remove the lemon and cinnamon; add a gill of cream or a small piece of fresh butter; mix thoroughly and pour into the prepared mould. When quite cold and firm turn out on a dish. Sufficient sauce is produced by the caramel sugar having partly dissolved. This pudding should not be made stiff, and when no cream is used it is advisable slightly to increase the quantity of milk.

Balmoral Rice Pudding

Line one or more plain charlotte moulds with caramel sugar and a mixture of cold rice prepared as for the rice pudding. Then with a palette knife spread on the rice to about an inch thick; fill in the centre with stewed apricots free from syrup; cover all with another layer of rice, and stand the moulds on a bed of ice until ready for turning out.

Balmoral Pudding, No. 2

This pudding consists of alternate layers of two kinds of filling prepared with the following ingredients. The first mixture is made by creaming together 1 oz. of honey, 4 oz. butter, 3 oz. moist sugar, and six yolks, then adding the whipped whites of four eggs, 4 oz. of pre-

served cherries cut small, one liqueur glass of noyau, and 5 oz. flour. The other filling is prepared by mixing together 8 oz. of crumbs from a stale brown loaf and 3 oz. of currants, with sufficient milk to moisten and form a paste. Flavour with vanilla, and fill into dressed moulds with alternate layers of the other preparation. Steam these in the usual manner, and serve with clear apricot sauce.

Rice and Apple Pudding

Line a fancy-shaped mould with a mixture of stewed rice as prepared for Balmoral pudding. This should have a thickness of an inch. When the rice is too soft to be used for this purpose, add extra ground rice before taking the pan off the stove; or, better still, stir in a small quantity of melted gelatine. The preparation should then be allowed to cool before using. Fill the hollow with apple jelly or apple marmalade; cover with rice and, when quite cold, turn out on to a silver or glass dish. Decorate the top with some jelly piped on with a paper cornet; also arrange a small quantity around the base.

A large assortment of moulded rice puddings may be made by carefully following the instructions given above. All kinds of stewed fruits or prepared jelly may be used for the filling. They are easily made, and will be suitable for a first- or second-class trade. Where a good price can be obtained flavour the fruit with liqueurs, and make the appearance more attractive with extra decoration.

Apple Marmalade

Apple marmalade has been referred to, and as this conserve is used in other varieties of puddings, it is advisable at this stage to give directions for its preparation. Cut thirty sound cooking apples (Ribston or Blenheim orange pippins) in quarters; peel and core them, and place in a tinned copper stewpan. Add a small quantity of water; stand the pan over a steady fire; place on the cover and cook the fruit without allowing it to mash. When ready add 3 oz. of fresh butter, the rind of two lemons, a few bay leaves, sufficient castor sugar to sweeten, and a piece of stick cinnamon. Mix all together and cook further until the apple is stewed to a pulp. Remove the lemon, &c., and the marmalade will be ready for use. It should not contain much liquor, especially if only a small quantity of water was added for steaming purposes.

Palermo Pudding

Prepare a plain mould, dress with clarified butter, and decorate the top with quarters of preserved orange and split cherries. Fill with alternate layers of stale sponge cake and apple. The latter should be prepared without rind or core, and cut very thin. Have ready the following: 3 gills milk, 1½ oz. castor sugar, two eggs, and three yolks. Mix all together with a whisk, flavour with the zest of orange, and pour into the mould. To ensure the cake being soaked through with the custard, the latter should

be poured on gradually. Fasten a piece of buttered paper on the top of the mould, and bake in a fairly hot oven. Serve hot, with a sauceboat of whipped cream and custard mixed, and flavoured with curaçao.

Semolina Pudding

Place in a saucepan 10 oz. of semolina, 1 pt. of milk, and 4 oz. castor sugar. Stir this over the fire until the mixture boils; then work it perfectly smooth with a spoon, and continue working the paste over the stove until it ceases to adhere to the sides of the pan; then lift it from the fire and gradually mix in 4 oz. fresh butter, 4 eggs, 4 yolks, and ¼ gill orange-flower water. Dress a pudding mould with butter, fill with the semolina, and while so doing sprinkle in some coarse crushed pieces of ratafias. Cover the mould with buttered paper; stand this in a saucepan containing a small quantity of hot water; place on the cover; stand over the fire, and steam for one hour. When ready turn the pudding out on to a dish, and serve with custard flavoured with orange-flower water.

Another method of preparing this pudding is to bake it in a shallow pie dish. Place in the bottom of the dish a layer of orange marmalade; round the border fasten a narrow strip of best puff paste; notch this with the back of a knife; fill in with the prepared mixture, then sprinkle the ratafias on top and bake for twenty minutes.

Vanilla Pudding

Cream together 4 oz. of fresh butter and an equal quantity of castor sugar; beat in six yolks; add the whites of four eggs beaten to a stiff foam; flavour with essence of vanilla, and stir in lightly 3 oz. of flour and 1 oz. of corn flour. Dress a fancy-shaped mould with butter; place in the bottom a small piece of greased paper; decorate with cherries and angelica; pour in sufficient mixture to three-quarters fill; cover with paper, and steam for one hour. When ready turn the pudding out on to a dish, remove the paper, and serve with a rich vanilla custard.

Chocolate Pudding

Prepare a mixture of butter, sugar, and eggs, as for vanilla pudding; stir in 1 oz. of melted, unsweetened, block cocoa; add a little vanilla essence, and lastly the flour. Dress a plain mould with butter, cover this with some fresh-cut filleted almonds; three-quarters fill with the preparation, and steam in a covered saucepan. When ready transfer to a glass or silver dish, and serve with chocolate custard, with which some whipped whites of egg have been mixed.

Coffee Pudding

Use the same mixture and method as given above for chocolate pudding, only, instead of using cocoa for flavouring, add coffee essence and a full tablespoonful of brandy. Serve hot with custard flavoured with coffee and brandy.

Tutti-Frutti Pudding

Another very nice-eating sweet is that known as Tutti-Frutti Pudding. Cream together 5 oz. fresh butter, 1 oz. of white honey, and 3 oz. castor sugar; when these ingredients are beaten to a light creamy substance, add 6 yolks, the whites of 5 eggs whipped to a foam, and 4 oz. of chopped mixed fruit, consisting of preserved cherries, greengages, apricots, and angelica. Stir in lightly 5 oz. of flour, and pour the batter into a mould previously buttered and decorated with various coloured fruits. Steam for one hour; when ready turn out on a dish, and pour over it some clear apricot sauce flavoured with maraschino.

Ginger Pudding

Cream together 2 oz. of golden syrup, 4 oz. of fresh butter, and 3 oz. castor sugar. Beat in 5 eggs; add ½ oz. ground ginger, 3 oz. of preserved ginger cut into small cubes, and 5 oz. of wheat flour. Dress a plain mould with butter and small pieces of preserved ginger; add the mixture, and finish by steaming for one hour. Turn out on a dish and serve with clear ginger syrup.

A large variety of puddings may be made by the above methods, by simply changing the flavour and serving with either custard or clear syrup strongly flavoured with liqueurs, spirits, or other flavourings. Special care should be taken with the steaming of these puddings; the water should not cover more than one-third of the mould, and on no account must it be allowed to boil furiously. Precaution is also necessary not to touch the pudding until cooked, as the mixture being so light may drop and become heavy if disturbed.

Amber Pudding

Take 8 oz. of suet, free from skin, and chop it very fine; pass all through a wicker sieve, and mix with it 8 oz. of bread crumbs, and an equal quantity of moist sugar. Place these ingredients in a mixing bowl; add 8 oz. of orange marmalade, the zest and juice of two lemons, and five eggs and three yolks. Mix thoroughly, and transfer to a mould previously prepared with clarified butter; cover with paper and steam gently for three and a half to four hours. Caution is required in the preparation of amber pudding, not to disturb it while being steamed; and as it requires thorough cooking, on account of its containing suet and marmalade, ascertain whether it is ready for serving by inserting the blade of a small knife in the centre. When the knife is removed it will be quite dry if the pudding is ready for the table.

Lemon Sauce for Amber Pudding

Lemon-flavoured sauce is required for amber pudding. It may be served in a sauceboat, or, in the case of small puddings made in dariole moulds, poured on to the dish. This sauce should contain the zest of lemon

removed from the fruit in long shreds. This adds to the flavour, and improves the appearance. Bring to the boil 3 gills of weak syrup, the zest of two lemons, and the juice of one lemon, four bay leaves, and a small piece of stick cinnamon. When boiling add 1 oz. of arrowroot mixed with the smallest possible quantity of water; bring all to the boil. After removing the bay leaves and cinnamon the sauce will be ready for serving.

Princess Pudding

Prepare a large fancy-shaped charlotte mould, or small dariole moulds, with clarified butter; place a piece of greased paper in the bottom and sprinkle on top of this a mixture of chopped cherries and preserved melon. Weigh down 4 oz. butter, 5 oz. castor sugar, 3 oz. wheat flour, 2 oz. ground almonds, 1 oz. corn flour, five whole eggs, five yolks, half a liqueur glass of maraschino; 4 oz. of preserved cherries and melon cut into small cubes. With a light whisk beat the butter and sugar together until both these ingredients become light and creamy. Add the eggs and yolks gradually, then stir in lightly the other ingredients. The mould or moulds should not be more than three-quarters filled with this light mixture; cover over with grease-proof paper, and steam in the usual way. Serve with a rich custard sauce, flavoured strongly with maraschino and noyau.

Chestnut Pudding

Get ready 4 oz. butter, 3 oz. golden syrup warmed, 2 oz. moist sugar, 3 oz. of preserved chestnuts (marrons glacés) passed through a wire sieve, 4 oz. wheat flour, 3 oz. bread crumbs, one liqueur glass of kirsch, three eggs, and a little milk. Cream together the butter, sugar, and eggs; add the syrup and the other ingredients, and fill in moulds prepared and dressed with butter and a few filleted almonds and pieces of preserved chestnuts. This pudding will require more time for cooking, and should be served with a rich sauce consisting of apricot pulp flavoured with kirsch.

Raspberry Pudding

Prepare 8 oz. of suet, 6 oz. bread crumbs, 2 oz. ground almonds roasted, 6 oz. moist sugar, 6 oz. best quality raspberry jam, five eggs, and the zest of two oranges. Chop the suet and pass it through a wicker sieve; add the other ingredients, and mix all together into a medium soft paste. If this should be too firm, moisten with milk. Fill into dressed moulds; steam in a small quantity of water; and serve along with stewed raspberries. If fresh or bottled fruit cannot be obtained, prepare a rich custard and flavour with essence of raspberry, and colour with carmine.

Plain Raspberry Pudding

Another raspberry pudding, not quite so rich, is made by lining a greased mould or basin with a mixture consisting of bread crumbs moistened with milk, and adding two eggs to each 8 oz. of crumbs. The mould

is then filled in the centre with raspberry jam, and another layer of crumb mixture placed on top, when the whole may be steamed, or baked in a fairly hot oven. When ready for serving, turn the pudding out on to a dish and dust with fine castor sugar.

Bread Crumbs in Puddings

Bread crumbs may be used largely in the preparation of various kinds of puddings. For a plain pudding take a portion of crumbs; sweeten with sugar; flavour with lemon, orange, or other flavour as may be required; moisten with milk and eggs; force all into a mould or basin dressed with fat, and bake or steam until firm, so that the pudding may be turned out without breaking. Puddings made with crumbs as suggested and nicely flavoured give satisfaction to customers and yield a fair profit.

Pineapple Pudding

Pineapple pudding is prepared in a manner slightly different from the others already given, but any of the above methods will give satisfaction by substituting pineapple flavouring in place of that given in the recipe. Prepare a plain charlotte mould with a dressing of clarified butter into which a little flour has been mixed. Cover the bottom and sides with thin pieces of preserved cubes of pineapple; cover these in turn with a 1-in. layer of paste, made by mixing together a portion of bread crumbs with yolks of egg and milk. Weigh down into a mixing bowl 4 oz. of butter (previously clarified), 3 oz. castor sugar, and 1 oz. of honey; cream these ingredients together; beat in four eggs; add 1 liqueur glass of maraschino, and stir in lightly 3 oz. of flour and 1 oz. of corn flour. Fill the centre of the mould with this preparation, cover with greased paper, and steam until cooked, when the pudding will be light and spongy, and may then be turned out of the mould. Serve with a rich sauce flavoured with pineapple purée.

Coburg Pudding

For this pudding it is necessary to have some ready-baked currant buns; those of the previous day's baking are most suitable. Cut in circular slices, place on a dish, sprinkle over them some maraschino, and cover each with a thin layer of apricot jam. Dress a plain mould with butter, decorate with preserved cherries and angelica, and fill with the prepared slices; the mould must then be filled with custard, made by mixing together 1 pt. of milk, 3 oz. castor sugar, three eggs, and four yolks. Steam in the usual way, and serve with boiled custard flavoured with a split vanilla bean.

Saxony Pudding

Prepare 12 oz. of brown bread crumbs, 6 oz. of castor sugar, six eggs, ½ pt. of whipped cream, some lemon zest, and a little pounded cinnamon. Mix the bread crumbs, sugar, the yolks of eggs, whipped cream, the lemon and cinnamon together in a basin; then add the whites whipped to a stiff

foam, and set the mixture aside. Dress a plain charlotte mould with butter; cover this with brown bread crumbs, then spread a large spoonful of the preparation at the bottom of the mould, and arrange a layer of small bright fresh or preserved cherries upon it. Cover this with more of the preparation, and continue with the cherries until the mould is filled. Cover with greased paper, place on a baking sheet, and bake for forty minutes. When ready turn out on to a dish, and pour over it some clear sauce made with cherry purée and flavoured with kirsch and noyau. If the sauce is not required, cover the pudding with a mixture of cinnamon sugar.

Apricot Pudding

For apricot pudding the following ingredients are required: 5 oz. of butter, 8 oz. of preserved apricot, 3 gills milk, 1 gill of cream, six large eggs, 5 oz. castor sugar, 6 oz. of flour. Put the butter, sugar, cream and milk into a saucepan on the fire, and as soon as these begin to boil remove the pan from the stove and stir in the flour; then put this paste back again on the stove, and continue stirring it for three or four minutes. It must then be withdrawn, and the six eggs beaten gradually into it. Cut the apricot into small pieces, add these to the preparation, and pour into a mould previously greased and decorated with pieces of apricot. Steam for one hour and forty minutes; turn out and serve with either apricot syrup, or rich custard flavoured with kirsch and a little lemon.

Orange Pudding

For orange pudding the following ingredients are required: the zest and juice of three oranges, ½ pt. of cream, 1 gill of milk, 4 oz. of crushed ratafias, 5 oz. of bread crumbs, fourteen yolks, four whites, 10 oz. castor sugar, and a little powdered cinnamon and nutmeg. Place the ingredients (with the exception of the whites) into a mixing bowl, and whisk all together for about eight minutes. Whisk the whites to a stiff foam; add to the preparation; mix all together without overworking, and pour into a pie dish previously buttered and prepared with a border of puff paste placed around the edge. Bake in a steady heat for half an hour, and dust with fine sugar before sending to table.

The above recipe will make the foundation for several kinds of puddings, all that is required being to change the flavouring, and where necessary to use other crumbs than those made from ratafias.

French Pudding

Weigh into a large basin 11 oz. of chopped marrow, 7 oz. of flour, 3 oz. bread crumbs, 6 oz. of apricot jam, a little cinnamon sugar, the zest of two oranges, 4 oz. chopped apples, 5 oz. of preserved cherries, 5 oz. of chopped drained orange and citron peel, 3 oz. castor sugar, a little grated nutmeg and mace; five whole eggs, a glass of brandy, and half a pint of cream and milk mixed. Mix all the ingredients together, to the consistency usual for

ordinary suet pudding, and turn into a buttered mould or basin previously dusted with flour. Tie the pudding in a cloth, boil for four hours; turn out and serve with a light custard sauce (see next chapter).

Ostend Pudding

For Ostend pudding the ingredients required are: 12 oz. of bread and cake crumbs mixed, the zest of three lemons, two glasses of madeira, 2 oz. of sweet ground almonds, ½ oz. of ground bitter almonds, and 6 oz. of sultanas. Place all into a basin and add a caramel custard made with eight yolks, two eggs, ½ pt. of cream, ½ pt. of milk, 8 oz. of castor sugar, with sufficient burnt sugar to flavour. Prepare a greased mould; decorate with pieces of preserved orange peel and stoned raisins; fill in with the above mixture, and steam for about one hour and a half. When done turn out on a dish; cover with a rich custard, or arrowroot sauce, and serve while hot.

Cabinet Pudding

There does not appear to be any set recipe for the preparation of this pudding. Sometimes it is made with crumbs of cake or bread made into a paste coloured with caramel and mixed with fruit; on the other hand, it sometimes consists of pieces of cake soaked in a custard, then moulded and steamed. The following method will turn out a satisfactory pudding, which may be prepared in large charlotte or fancy-shaped dariole moulds. Spread the inside of a mould with butter, and ornament it with pieces of preserved cherries, orange peel, and angelica. Fill the mould with alternate layers of slices of stale sponge cakes, crushed macaroons, ratafias, currants, and sultanas; then fill up with custard prepared as follows. With a whisk mix eight yolks of eggs, one whole egg, 1 pint of milk, 4 oz. castor sugar, and the zest of one lemon. This custard should not be boiled or heated, just mixed together and used at once. Steam the pudding in the usual way for one hour and a half, and when done serve with rich custard sauce.

Plain Bread Pudding

Prepare three whipped whites, eight yolks, the zest of one lemon and one orange, 1 pt. of milk, 3 oz. of butter, 7 oz. castor sugar, and 13 oz. of bread crumbs. Put the crumbs, milk, yolks, flavouring, and butter together into a mixing bowl. When the bread is saturated with the milk, add the whipped whites, and transfer the whole to a greased mould and steam. Turn out on a dish and sprinkle over it some roasted sponge-cake crumbs. Serve with a lemon-flavoured arrowroot sauce.

Conservative Pudding

Place into a bright tinned saucepan 1 lb. raspberries, ½ lb. red currants, and the rind of one lemon, together with 1 gill water and sufficient sugar to sweeten, and bring to the boil over a steady fire. Prepare a deep pudding

basin, line it with the crumb of a new tin loaf, having the bread about ¼ in. thick. Pour upon this the fruit and juice; allow all to settle; then cover with a plate; place a heavy weight on top and store in the larder until the next day. Turn out from the basin on to a shallow dish and cover with whipped cream. Several varieties of fruit may be used in the preparation of this pudding; it makes a nice-eating sweet for hot weather, and does not cost much to produce.

Tapioca Pudding

Place into a stewpan 10 oz. tapioca, 2 oz. butter, the zest of one lemon, together with 1 qt. milk. Bring to the boil; then allow the mixture to simmer for twenty minutes until the tapioca is cooked. Withdraw the pan from the stove, turn the mixture out into a cold basin, add eight yolks, two whipped whites, sufficient sugar to sweeten, and pour into a buttered pie dish on which has been laid previously a narrow border of rich short paste. Sprinkle over it a little grated nutmeg and bake in a solid oven. If desired, this pudding may be steamed in a buttered mould, and served with a prepared sauce. Rice, sago, or semolina may be served in the same manner.

Nouille Pudding

Nouille paste as prepared for this pudding is made by mixing into a tight dough: flour, yolks, and a small quantity of salt. This is then pinned out as thin as possible, allowed to dry partly, then cut up into very thin shreds. In this condition it is used as a substitute for macaroni, and many nice-eating dishes are made with it either as a sweet, or as a savoury with Parmesan cheese. Bring to the boil 1 qt. milk, drop into this the amount of nouille required, and allow all to simmer gently; when cooked, finish as directed for semolina pudding. It may be that more or less milk will be required, but this must be decided at the time of preparing.

Parmesan Cheese Pudding

Mix together 4 oz. flour, 4 oz. butter, a little pepper and salt, and 1 pt. milk; place all into a saucepan and stir the mixture over the fire until it boils. Work the batter quickly with a spoon to render it perfectly smooth, then add 12 oz. of Parmesan cheese grated, and twelve yolks of eggs; whip twelve whites of eggs quite firm and stir these into the preparation. Fill small or large soufflé cases with the mixture, bake for about forty minutes, and send to the table as soon as ready. The whites for this mixture should be beaten quite firm, and must be gently mixed in, so as not to render the pudding heavy.

Imperial Pudding

Prepare 2½ oz. castor sugar, 3½ oz. butter, 5 oz. flour, 1½ oz. corn flour, two large eggs, a pinch of baking powder, essence of vanilla, and a little milk. Cream the butter and sugar together; beat in the eggs; add flour

and corn flour previously sieved with the powder, then the milk and essence. Put two full tablespoonfuls of bright-coloured raspberry jam into the bottom of a well-greased pudding basin; pour in the mixture, cover with greased paper, and steam for one hour. Serve with custard sauce flavoured with raspberry and vanilla.

Christmas Pudding

The ingredients are: 12 oz. of sultanas, 10 oz. of sugar, 8 oz. bread crumbs, 10 oz. mixed peel shredded, ten eggs, 1½ lb. of raisins, 1¼ lb. of currants, 1¼ lb. of finely chopped suet, 4 oz. of flour, 3 oz. of almonds blanched, ½ oz. of best mixed spice, a little crushed mace, a little salt, two wine glasses of curaçao, one glass of brandy, and an equal quantity of maraschino or best Jamaica rum, the zest and juice of two lemons, and the zest of two oranges. Thoroughly mix all the above together, fill into two greased moulds or basins, cover with grease-proof paper, tie a piece of cloth over, and cook each for from five to six hours. When ready serve with a clear sauce, flavoured with rum and lemon zest. These puddings are usually made a considerable time before they are to be used, in which case they require reboiling or steaming for about two hours to make them hot right through.

Christmas Plum Pudding, No. 2

Skin and chop very fine 13 lb. of beef suet, and mix with this 4 lb. bread crumbs, 6 lb. flour, 5 lb. soft sugar, 5 lb. orange peel chopped very fine, 20 lb. seedless or stoned raisins, 8 lb. currants, 2 lb. almonds chopped very fine, and 3 lb. apples chopped into small pieces (about 4 lb. with skins and cores). Season with 6 oz. of mixed spice, consisting of 2½ oz. ground cinnamon or cassia, 1 oz. ground coriander, 1 oz. ground ginger, 1 oz. ground nutmeg, and ½ oz. ground cloves. Mix into a soft dough with 5 pints eggs and 5 pints milk. When half mixed, sprinkle in one bottle best rum, and ½ bottle maraschino. The mixture is placed in pudding basins, covered with greased paper, and cloths tied over, and boiled in the usual way. A two-pound pudding takes about three hours to cook, larger sizes requiring proportionately longer time. Care must be taken when adding fresh water to the boiler that the added water is also boiling or nearly so. The basins must be quite filled with the mixture, or there is a danger of water entering and making the pudding sodden.

Noir Pudding

Weigh down 6 oz. of chopped suet, 7 oz. of black treacle, 12 oz. bread crumbs, 4 oz. corn flour, 6 oz. currants, 6 oz. sultanas, 4 oz. of finely chopped orange peel. Mix all together and moisten with two eggs and sufficient milk to make into a medium stiff dough. Pour into a basin previously greased and lined with roasted bread crumbs; cover with greased paper, and steam for two and a half hours. Turn out on a dish; dust with fine sugar mixed with an equal quantity of cocoa, or serve with caramel sauce.

Strawberry Pudding

Prepare some custard with 5 gills of milk, 2 oz. of sugar, 1½ oz. corn flour, five yolks, the zest of one lemon, and three bay leaves. When the custard boils remove the bay leaves, pour the custard into a greased pie dish, and cover with a layer of bright-coloured strawberry jam. Beat three whites of eggs to a stiff foam, sweeten to taste, flavour with vanilla, and spread this over the custard. Dust with fine sugar, and bake for seven to eight minutes in a fairly hot oven. Apple purée and other kinds of prepared or fresh fruit may be used with advantage for puddings prepared with custard and meringue.

Biscuit Pudding

Fill a large mould, or some small basins previously buttered, with alternate layers of pieces of stale sponge cakes, crushed macaroons, pieces of preserved melon, and long shreds of the zest of lemon and orange. Prepare a custard—not made hot—with 1 pt. of milk, 1 gill of cream, 4 oz. castor sugar, four eggs, two yolks, and a little vanilla essence. Pour the preparation into the moulds to soak the cake, cover with paper, and steam for one hour. Serve hot or cold with custard sauce or with stewed raspberries and red currants.

Bread and Butter Pudding

Fill a greased pie dish with thin slices of buttered bread; sprinkle on each layer a few currants, sultanas, and finely chopped lemon peel. Cover all with custard as prepared for biscuit pudding, and when the bread is saturated with the preparation bake for thirty minutes in a hot oven. Dust when ready with fine sugar. This may be served hot, or when cold cut out of the dish and sold in small portions.

Slices of bun, brioche, or savarin, toasted and covered each side with fresh butter, and baked with custard, make a rich-eating pudding, and may be prepared at a small cost.

Plain Plum Pudding

Weigh down 1 lb. of flour, 4 oz. of bread crumbs, and 12 oz. of finely chopped suet. Mix these together, with the zest of two lemons and sufficient water to make all into a medium stiff dough. Work into this 1 lb. of stoned raisins. Place the mixture in a buttered basin, cover with greased paper and cloth; boil a pan of water, stand the pudding in it and boil for three hours. Turn out on a dish, dust with fine sugar, and serve with custard. Although a fair proportion of suet is added to the above mixture, the pudding will not be light unless the suet is carefully prepared. It must be free from skin or gristle, and before being chopped it should be shaved into flakes, and this will render the pudding less liable to become heavy and unsatisfactory.

Rice and Stewed Fruit

In many catering establishments it is the usual practice to keep a pan of cold rice prepared for moulding and serving with various kinds of stewed fruit. The process of preparation is simple and will give satisfaction if the following directions are adhered to. Wash thoroughly the rice intended for boiling; place this in a stewpan and add sufficient milk and water to cover. Add a few bay leaves, a piece of stick cinnamon, some crushed mace, the zest of one or two lemons, and bring all to the boil. More water and milk may be required before the rice is cooked, but too much will make it "sloppy" and unsuitable for the purpose required. When ready sweeten to taste, add a little cream or some fresh butter, and transfer to a basin to cool, ready for use.

To mould the rice when preparing portions for one or more persons, press the quantity required into a mould or basin, turn this out on a dish, and arrange the portion of stewed fruit at the side. **Moulding Boiled Rice.**

College Pudding

Put into a basin 12 oz. of currants, 10 oz. castor sugar, 14 oz. of bread crumbs, 9 oz. mixed peel chopped small, 10 oz. of suet, and 10 oz. of marrow, both chopped and passed through a wicker sieve. Moisten with four or five large eggs, 1 gill of sherry, 1 gill of brandy. Add the zest of two lemons; bake or steam in buttered moulds, and serve with Madeira sauce.

CHAPTER XXXVIII

SWEET SAUCES FOR PUDDINGS

Madeira Sauce

Put into a stewpan 1 gill of madeira, ½ gill of brandy, a full tablespoonful of castor sugar, five yolks, and two eggs. Stand the pan over a slow fire, and whisk the mixture until it becomes quite light; but it should not be made very hot. Serve at once by pouring part over the pudding, and send the remainder to table in a sauceboat.

Apricot Sauce

Place in a stewpan ½ pt. of stock syrup (see vol. i, p. 334), the rind and juice of one lemon, a piece of stick cinnamon, five bay leaves, and 2 oz. of sweet ground almonds. Bring to the boil; then add ½ pt. of water mixed with 2 full tablespoonfuls of arrowroot. Allow all to simmer for a few minutes, then remove from the stove, strain through a hair sieve, add one liqueur glass of noyau, and serve in a sauceboat.

The above mixture and method of preparation will serve as the

foundation of many kinds of fruit sauces. With this a rich rum sauce may be prepared for Christmas Pudding; flavour with rum and brandy just before sending to the table.

Rich Vanilla Sauce

Mix together 1 pt. of milk, four yolks, three eggs, 3 oz. of castor sugar, half a vanilla bean; place all into a stewpan over the stove, and keep well stirred until the mixture is thick enough to coat the spoon. Remove at once to a cold pan; add ½ pt. of cream, remove the vanilla bean, and the custard will be ready for serving.

Plain Custard

Bring to the boil 1 pt. of milk with 3 oz. of sugar, remove from the stove and pour the hot milk upon a mixture consisting of four yolks, mixed with ½ oz. of corn flour. Whisk all together, return again to the stove, and bring to the boil. This custard may be served with many kinds of puddings, flavoured as required, and will give satisfaction if made quite smooth and free from lumps.

Apple Sauce

Peel the number of apples required, cut them into quarters, and place them in a stewpan with some weak stock syrup, a few cloves, and a little lemon zest. Bring all to the boil, and when the fruit is cooked, take them out of the syrup, thicken the latter with a little arrowroot, then return the apples, cook them for a few minutes longer. Strain all through a fine strainer or tammy cloth, and serve while hot.

Orange Sauce

Place into a saucepan 1 pt. of water mixed with 1½ oz. of arrowroot, add the zest of three oranges, the juice of two (without pips), sufficient lump sugar to sweeten, and bring all to the boil. Strain the sauce through a tammy and serve hot.

Enough has been said to give a general idea of the method of preparing various sauces for puddings. Using these as a basis to work upon, and with the various fruits and other flavouring material at hand, the cook or confectioner need never be at a loss to prepare suitable sauces for all kinds of sweets, either for private or for public functions.

FOUR NOTABLE IRISH BAKERS

GEORGE F. INGLIS, born in Dublin of Scotch parents and educated in Glasgow, was for a time in the drapery trade in Dublin, but in 1883 joined his brother in the baking firm of Inglis & Co. in Belfast. The firm was converted into a private limited company in 1886, and was floated as a public company in 1894, Mr. Inglis having been since then managing director. He has been President of the Belfast Master Bakers' Association since its formation in 1901, and he was first President of the Irish National Master Bakers' Association. He has also served as President of the North of Ireland Grain and Flour Trade Association.

HUGH KENNEDY was born at Dublin in 1864, and was trained in a solicitor's and commercial office. In 1885 he succeeded his father as proprietor of an old-established bakery business in his native city. He is Treasurer of the Irish Master Bakers' Association, and has been a Member of Council of the National Association of Master Bakers.

GEORGE BAINE, born in Larne in 1868, served an apprenticeship there as a baker, and afterwards joined his brother in a baking business. In 1894 he established a business of his own in Larne, and from 1902 to 1908 he was managing director of the business of Messrs. Wilson & Strain, Belfast. He has been very successful in the competitions at the London Exhibition. He was for several years Secretary of the Belfast Master Bakers' Association, and was one of the most active founders of the Irish National Master Bakers' Association. He takes a great interest in Technical Education.

PETER LYONS, born in Drogheda as a master baker's son, served an apprenticeship as a baker in Dublin, and in 1885 returned to Drogheda, where he bought a baking business, which is now well equipped and flourishing. He has been a member of the National Association of Master Bakers almost since its foundation, and he took a leading part in establishing the Irish National Master Bakers' Association. He is an expert in judging horses.

G. F. INGLIS
(Belfast)

H. KENNEDY
(Dublin)

GEORGE BAINE
(Belfast)

P. LYONS
(Drogheda)

FOUR NOTABLE IRISH BAKERS

CHAPTER XXXIX

WINE CUPS AND ICED LIGHT REFRESHMENTS

Wine cups are extremely popular for wedding breakfasts, receptions, ball suppers, luncheons, and, in fact, all sorts of parties. They consist of various wines flavoured with liqueurs, and spirits, slightly sweetened, reduced with mineral waters, and iced for at least one hour before being served at table.

Claret Cup

2 bottles good sound claret.
2 bottles soda water.
2 bottles seltzer water.
2 bottles lemonade.
2 oz. castor sugar or crushed sugar candy.
A small bunch of balm and borage.
12 thin slices cucumber or the rind of same.
4 lemons sliced.
1 wine glass brandy or sherry.
About 2 lb. clean rough broken ice.

Place all the ingredients into a large bowl or pan. Stir all together, and cover over for one hour. Strain through a muslin or hair sieve into large glass jugs, and serve from these. Many never put the ice inside, but ice only by standing it in ice tubs.

The following is another recipe for a claret cup: One bottle of claret, one bottle of seltzer water, one bottle of soda water, a little lump sugar, a piece of cucumber, the rind of one orange, one lemon cut into slices, a small bunch of balm and borage. Mix all together, ice for one hour, strain, and, before serving, add one liqueur glass of brandy, and one of curaçao.

Hock Cup

2 bottles hock.
2 bottles seltzer water.
2 bottles soda water.
4 lemons sliced.
A bunch of balm and borage.
4 oz. bruised sugar candy.
One wine glass curaçao.
About 2 lb. clean rough ice.

Put all the ingredients together into a large bowl, stir, cover up, and stand for one hour. Strain, and serve from glass jugs.

Moselle Cup

For this cup use the following, and prepare in the usual manner: One bottle of sparkling Moselle, one bottle seltzer water, one bottle of

Apollinaris water, a little balm and borage, two lemons sliced, a piece of cucumber, a little sugar or stock syrup, one wine glass of brandy.

Burgundy Cup

Ingredients: One bottle of red Burgundy, one quart bottle of seltzer water, a bunch of balm and borage, the rind and juice of one orange, the rind of one lemon, a few slices of cucumber, three bay leaves, a little syrup, one wine glass of curaçao, and one small piece of stick cinnamon. Prepare in the usual way and strain through a piece of muslin.

Badminton Cup

2 bottles red Burgundy.
2 bottles soda water.
2 bottles seltzer water.
The juice of 4 oranges.
4 oz. bruised sugar candy.
A bunch of balm and borage.
A sprig of verbena.
One glass maraschino.
A pinch of ground nutmegs and cloves.
About 2 lb. clean rough ice.
12 slices cucumber or the rind of same.

Place all the ingredients into a large bowl or pan. Stir up, and cover for one hour; strain through a muslin or hair sieve into glass jugs, and serve.

Loving Cup

1 bottle brandy.
½ pt. orange juice.
The rind of 4 oranges rubbed on loaf sugar.
The juice of 4 lemons.
1 qt. water.
½ lb. castor sugar or bruised sugar candy.
2 lb. rough ice.

Stir all together. Cover and stand for one hour in a bowl, and serve in a loving cup.

Champagne Cup

2 bottles champagne.
2 bottles seltzer water.
2 bottles soda water.
2 oranges and 2 lemons sliced.
About ½ lb. pineapple, torn off with a silver-plated fork.
A bunch of borage.
¼ lb. bruised sugar candy.
2 lb. broken rough ice.

Mix all together in a bowl, and stand for two hours. Strain, and serve in glass jugs.

Another champagne-cup recipe is as follows. Into a large jug or decanter put one bottle of champagne, one bottle of soda, and one bottle of seltzer water, one lemon sliced, a small bunch of mixed borage and balm, a few cubes of sugar, and a very small piece of cucumber. Stand the vessel on a bed of rough ice, or better still, in an ice bucket for one hour; then strain through a piece of muslin, and it is ready for serving.

Cider Cup

2 bottles cider.
2 bottles seltzer.
2 bottles lemonade.
A bunch of balm and borage.
4 oz. bruised sugar candy.
1 glass brandy.
2 sliced oranges.
2 lb. clean rough ice.

Stir all together, and stand for one hour. Strain into glass jugs, and serve.

The following is another cider-cup recipe. Into a covered jug place 3 pints of cider, 1 pint bottle of seltzer water, 1 pint bottle of Apollinaris water, a little borage, the rind of one orange, the rind and juice of one lemon, a piece of stick cinnamon, a little syrup, and a little brandy. Stand the jug in ice, and finish in the usual manner.

Beer Cup

Into a jug pour 1 qt. of stout, 1 pt. of old ale, a little syrup, a small quantity of grated nutmeg, a piece of stick cinnamon, a few bay leaves, and a small piece of ginger. Finish in the usual manner, and serve in tumblers.

Other Cups.

There are several other kinds of wine, spirit, and fruit cups, such as Perry Cup, Chablis Cup, Pineapple Cup, Punch Cup, Gin Cup, and Chianti Cup, which are prepared in much the same manner, mixed with mineral waters, and strengthened with liqueurs and spirits.

Lemonade

4 qt. water.
12 good-sized lemons.
1 pt. simple syrup.

Rub the zest of six of the lemons on ½ lb. of loaf sugar, and scrape the same. Add to the water or juice; also 2 lb. of clean, broken, rough ice added. After all the ingredients have been strained through a muslin or hair sieve, very good lemonade is obtained, which is generally appreciated. Serve up in glass jugs.

Orangeade

Proceed as directed for lemonade, using the zest and juice of twelve oranges and four lemons, and a little less sugar than for the lemonade.

Other Fruitades. Many other fruitades can be made in the same way when in season.

Iced Coffee

Make a strong coffee of 1 lb. of freshly ground Mocha coffee, made with 6 pt. of cold water, clarified and strained through a muslin or flannel bag. When cold add 1½ pt. simple syrup, 1½ pt. new milk, and 2 pt. double cream, whipped. Put it into a freezer, and work up until it is thick, and serve up in small glasses or cups.

CHAPTER XL

SANDWICHES AND SAVOURY ROLLS

Among light refreshments generally served at wedding receptions, dances, &c., sandwiches and petits pains occupy a foremost position.

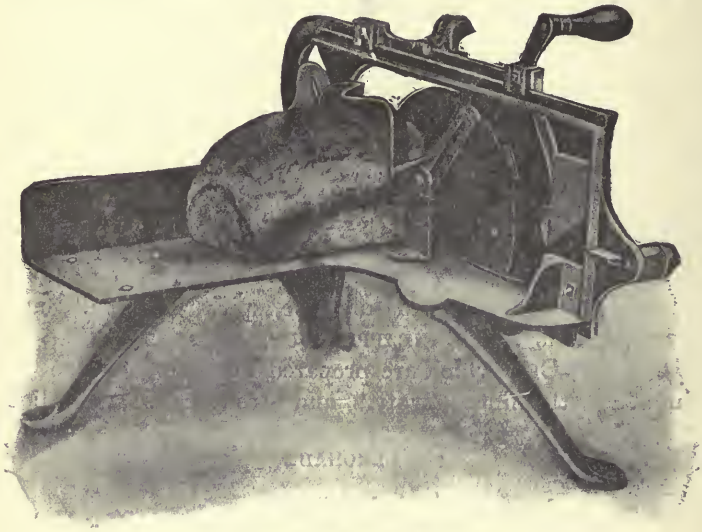


Fig. 143.—Bread-cutting Machine

Sandwiches and Petits Pains. This has not always been the case. Formerly at wedding receptions the menu consisted of roast joints, poultry, game, &c., with large sweets. During the last two decades a change has come about, and to meet this the caterer should supply articles that are small and tasty, which may be served with spoon and fork from the buffet table.

The following list of sandwiches and small rolls (petits pains) will supply a large variety which will be found useful for the purpose mentioned.

Bread intended for cutting into sandwiches should be a day old, and to save waste and time it should be baked in long 4-lb.-loaf tins. The number to be cut from each loaf depends on the size of the sandwiches required. The usual number is six dozen, which yields a moderately large sandwich such as required at most receptions, dances, and whist drives. Sandwich-cutting is usually a long and tedious job, and does not appear to give such good returns as are obtained from other articles supplied for such functions. It saves time to have the butter in a condition suitable for spreading on the bread with ease and without using more than necessary. To prepare this take the butter required, soften with the hand, then beat it with a whisk until it becomes quite light of a creamy consistence. An efficient bread-cutting machine (fig. 143) is a great assistance in this kind of work.

Sandwich-cutting.

Mustard-and-Cress Sandwiches

For hand-cut sandwiches use a long, thin, sharp knife. Cut from the loaf the top crust, that from the sides, also from the right-hand end; leave only the left-hand crust, against which the hand should be placed while keeping the loaf in position. Butter the bread, then cut a thin slice lengthways of the loaf, and continue until the loaf is used up. Lay all the slices side by side upon the board. Take some mustard and cress (previously washed, picked, and dried upon a cloth), and sprinkle this on top of half the number of slices of buttered bread. On top of the cress drop some chopped hard-boiled eggs, add some mixed seasoning made with salt and white and cayenne pepper. Cover each prepared slice of bread with those left plain, press them together lightly with the hand, pile one on top of another, then trim, and cut into plain or fancy shapes as required. When dishing up the sandwiches, place these in small heaps on a dish covered with a fancy paper or serviette, and cover entirely with a damp cloth until required for the table. When dishing the sandwiches some cooks prefer to arrange them so that one overlaps the other. This may appear neater than the method of heaping them on the dish, but the sandwiches dry very quickly when so exposed to the air, and are soon unpalatable.

Cucumber Sandwiches—Sandwichs de Concombres

Remove the skin from a fresh cucumber, and cut it into thin slices. Lay them in a shallow dish, sprinkle some seasoning over them, and partly cover with vinegar. Allow the cucumber to remain in the vinegar for one hour, then remove and drain on a cloth ready for laying on the buttered bread. Prepare some slices of bread and butter as already described, and lay these in position. Use half of them only for covering with cucumber, then sprinkle on them some white pepper, and cover with the plain slices. Finish as directed for mustard-and-cress sandwiches. Some lemon juice or a little white wine may be added to the butter to sharpen the flavour.

Tomato Sandwiches—Sandwichs de Tomates

Prepare some sound English tomatoes as follows. Remove the stalks, steep the fruit in boiling water for a few moments, then remove and peel off the skins without cutting the tomatoes. With a sharp knife cut the tomatoes into thin slices and lay them in a deep dish with some seasoning, a little vinegar, and a few slices of Spanish onion. Drain the tomatoes on a cloth and remove the onion; prepare the slices of bread and butter, and finish in the same manner as cucumber sandwiches. Some chopped parsley may be added to these sandwiches mixed with the butter, or sprinkled over the fruit.

Ham Sandwiches—Sandwichs de Jambon

These sandwiches are often spoiled by using ham of inferior quality; otherwise they are probably the most popular sandwiches. Cut some very thin slices from an English ham, and lay these on slices of buttered bread, the butter containing a little mustard. Cover with plain slices of buttered bread, press together, and cut into oblong, diamond, or square shapes.

Potted ham may be used for these sandwiches. Trimmings cut off the ham bone, and pounded with a little stock, then passed through a fine wire sieve, make suitable potted meat for sandwiches. Before using add some fresh butter, also a little grated nutmeg and a pinch of cayenne pepper. Spread this on the bread, cover each prepared slice of bread with one that is not buttered, and finish as required.

Tongue Sandwiches—Sandwichs de Langue

Prepare these sandwiches by placing between two layers of buttered bread very thin slices of ox tongue. Pressed tongues are more economical for this purpose than fresh tongues, as they cut to better advantage. Before covering each layer of meat add a little mixed mustard, or if preferred, the mustard may be mixed with the butter.

Smoked Salmon Sandwiches—Sandwichs de Saumon Fumé

It is essential to have the salmon sliced very thin for this purpose. Use as directed for tongue sandwiches without mustard; trim, and cut into small oblong pieces. Fresh salmon, pounded with some mayonnaise sauce (see vol. ii, p. 93), seasoned with cayenne pepper, and passed through a fine wire sieve, is useful for making choice fish sandwiches. By adding sufficient butter to this it will spread more easily, and no butter need be previously spread on the bread.

Beef Sandwiches—Sandwichs de Bœuf

Thin slices of pressed or roast beef may be used for these sandwiches, but usually potted beef is employed, and when this has been carefully prepared and flavoured a nice-eating sandwich is obtained. When preparing the sandwiches with thin slices of roast beef, mix some mustard and a

little finely-chopped horse radish with the butter used to butter the bread. Neither of these need be added when using pressed beef, as this is, or should be, already richly flavoured with seasoning and spices.

Potted Beef

Potted beef is prepared by placing into a stewpan some finely-cut pieces of gravy beef or buttock steak, a few bay leaves, some stock, and a little butter, and allowing all to simmer on the stove until the meat is cooked and the liquor reduced to a very small quantity. At the same time sufficient moisture must be left in the pan to prevent the beef becoming dry. Drain off what gravy is left in the pan, remove the bay leaves, turn the meat into a mortar, and pound until quite soft. Pass all through a sieve, return again to the mortar, add some butter, the gravy left from the boiling, a little mace, some grated nutmeg; colour and season to taste, and after mixing thoroughly transfer to a bowl, when it will be ready either for making into sandwiches or for potting.

Potted Veal-and-Ham Sandwiches

Potted veal and ham makes rich-eating sandwiches, and is worth the extra expense incurred in the preparation. Place into a stewpan 2 lb. of fillet of veal and 1 lb. of gammon of ham, cut into small pieces; add a little butter, some stock, a few bay leaves, and a little mace, and allow to simmer gently until the meat is tender. At this stage drain off the liquor and further reduce it on the stove; while this is proceeding pound the meat in the mortar and pass all through a sieve. Place the pounded meat in the mortar, then add the gravy, which, by the way, should be cold. Add the necessary quantity of fresh butter, some seasoning, and a little grated nutmeg, and mix all together with the pestle. This preparation will then be ready for spreading and making into sandwiches. There should be very little stock with the meat while stewing, and when care is taken in the cooking there will not be much left to be reduced on the fire after the meat is removed.

Chicken Sandwiches—Sandwichs de Poulet

Spread some slices of bread with a mixture of butter and suprême sauce (see vol. ii, p. 87). Sandwich these together with pieces of boiled chicken cut thin, and seasoned with salt, cayenne, and white pepper. Trim, cut as required, dish up, and ornament with pieces of watercress or parsley.

Chesterfield Sandwiches

Place on the board the required number of buttered slices of bread. On half the number sprinkle some finely-chopped boiled fowl, also some gherkins cut or chopped very small; throw some seasoning over them; place the plain slices of bread on to those which are covered with the chicken, and finish as required.

Fowl and Mushroom Sandwiches

A mixture of fowl and button mushrooms chopped very small, and mixed with some fairly stiff suprême sauce, makes a very satisfactory sandwich. Little sauce is required to bind the chopped fowl for spreading on the bread; if too much is used it will not only sodden the bread but so spoil the appearance of the sandwiches. Veal may be added to the preparation. This mixes readily with the fowl, and slightly reduces the cost. Cook some fillet of veal in a little stock, and remove all skin before chopping. This may then be mixed with the other ingredients. As a very cheap addition to fowl for sandwich purposes, boiled rabbit—Ostend for choice—may be used.

Foie Gras Sandwiches—Sandwichs de Foie Gras

For these sandwiches it is not necessary to use foie gras of best quality, as this would be too expensive. Potted foie gras, such as is usually sold in glass jars and tins, will give satisfaction, and if necessary, this may be mixed with some cooked liver previously pounded and passed through a sieve. Remove the foie gras from the jar, turn into the mortar, add some butter, season to taste, mix thoroughly, then use as directed for potted beef sandwiches.

Sardine Sandwiches—Sandwichs de Sardines

These sandwiches may be prepared with potted sardines and herring mixed, or as follows. Prepare some buttered slices of bread, and cover them with split sardines from which the bones and skins have been removed. Cover these with other slices of bread on which has been spread a mixture of butter, finely chopped parsley, and a very little onion, with a few drops of lemon juice or vinegar. Press all together lightly, cut oblong shape, and dish with pieces of parsley.

Anchovy Sandwiches—Sandwichs de Anchois

These sandwiches are prepared as those referred to above, by substituting anchovy for the sardines. As the flavour of this kind of fish is often too pronounced for many tastes, better results are obtained by sandwiching the bread with potted anchovy instead of the whole fish. If the latter is used, spread a thin layer of mustard and cress between the buttered bread while adding the split anchovies. This salad may also be added to the sardine sandwiches, as it greatly improves their appearance, and also makes them more palatable.

Lobster Sandwiches—Sandwichs de Homard

Remove the meat from a hen lobster and pound this to a very smooth paste with a little anchovy essence and about 10 oz. of fresh butter. Season with cayenne; add some grated nutmeg, and pass all through a fine sieve. It is then ready for use. When time permits, the flavour of this fish may be improved by adding some essence obtained from the lobster shells as

follows. Chop the shells and claws together; put them into a stewpan with a little stock; allow all to simmer on the stove and reduce to obtain the essence; this, by the way, should be added when quite cold.

Shrimp Sandwiches—Sandwichs de Crevette

Pound some tinned or fresh-picked shrimps to a smooth paste, with some fresh butter, a little cayenne, anchovy essence, and a small portion of fish essence obtained from bones and lobster shells. Colour with some pounded coral or with a little carmine, and place a thin layer between the slices of buttered bread. Another kind of sandwich may be prepared by using whole shrimps for sandwiching. These make very nice sandwiches, and may be further improved with mustard and cress.

Petit Pain de Foie Gras

Prepare some small brioche fingers, 2½ in. (see Brioche Paste, vol. i, p. 313); these should have a rich glazed appearance, which is obtained by washing the paste twice with egg and baking in a moderately hot oven. Split down the centre, and fill in with a nice layer of potted foie gras; dish up on an entrée dish and decorate with chopped parsley. Various kinds of potted meat, poultry, game, and fish may be used for filling purposes. These meats when cut or chopped small may be mixed with some suitable sauce made fairly stiff.

Chicken Rolls—Petits Pains de Volaille

Prepare some small oblong rolls, 3 by 1½ in., with rich brioche paste having each end of the roll square, and not rounded as for fingers. With a sharp knife make an incision on the top of each 2 by 1 in., and hollow this out, thereby forming a small case. Prepare some stiff white sauce (see vol. ii, p. 82); add to this some white pieces of chicken cut very small, some chopped button mushrooms, and a little truffle. When it is quite cold use this preparation for filling the brioche cases, and decorate with chopped aspic jelly and truffle. Serve up on papered dishes, and ornament with mustard and cress, or parsley.

Lobster Rolls—Petits Pains de Homard

Prepare some small cases as for chicken rolls; fill with a mixture of lobster sauce (see vol. ii, p. 83), to which has been added some finely chopped lobster and shrimps. Cover with aspic jelly, place in the centre some powdered coral, and serve on fine salad.

Shrimp Rolls—Petits Pains aux Crevettes

Mix some picked shrimps with sufficient shrimp sauce to bind all together. Have ready some small finger-shaped rolls, made either with brioche or from bread dough containing milk; make an incision down the centre, and fill with the preparation.

Salmon Rolls—Petits Pains de Saumon

Choice salmon rolls may be prepared by filling some small cases, made with bread dough, with a mixture consisting of chopped salmon, tarragon, chervil, and mayonnaise sauce (see vol. ii, p. 82).

In addition to brioche and bread dough being used for the preparation of these finger rolls and small cases, choice sandwiches may be made by using cream sandwich batons (see vol. i, p. 319). These eat nice and short, and are not only serviceable for the buffet table, but may also be served on the counter. Those fillings mentioned above for the petits pains, also those referred to for the preparation of sandwiches, may be used for serving in the split scones.

Chicken Rissoles

Very dainty and choice dishes suitable for serving with petits pains and sandwiches may be made in the shape of rissoles. Remove all bone and skin from some pieces of boiled chicken, chop the meat very small, add some pieces of ham, together with some button mushrooms, and mix with white sauce made with chicken stock. It is necessary to have the sauce made fairly stiff, so that when it is turned out on to a flat tray and is cooled, it sets firm and is easily shaped. Divide the paste into very small pieces, about twice the size of a walnut; drop these on some bread crumbs; shape into lengths about 2 in., and dip each into a mixture of beaten eggs, and roll upon some bread crumbs. Have ready some very hot clear fat and fry the rissoles to a light golden colour. Dish up and serve with plain or fried parsley. Another style of shaping is by rolling the various pieces in the shape of a cone, and finishing in the fat as for rissoles.

When a variety of sandwiches are supplied at any function it serves to indicate the kind if the various sorts are of different shapes; but as round or oval shapes are wasteful in cutting, the shapes used must follow those possible with straight lines. Thus some may be square, some oblong, and some triangular. The varieties can be indicated by little flags on which the names are neatly written, or by more expensive and substantial bannerettes of silk or silver, but very small.

CHAPTER XLI

THE CONFECTIONER-CATERER

Some confectioners and restaurateurs make outdoor catering a special business and give much more care and attention to that than to ordinary shop trade, but even when energy is not specially concentrated on this branch it is necessary, if it is to be made profitable, that it should be specialized as much as possible and kept distinct from ordinary shop and customer business. It is entirely doubtful

Outdoor Catering a Special Business.

if any substantial profit is made by those who obtain small outdoor orders at long intervals, who have to hire all or nearly all the plant, and to depend entirely on a staff engaged only for the occasion. Work of this sort entails an enormous amount of trouble and worry, and for want of practice and experience, and inasmuch as everything has to depend on thought and memory and nothing on routine, there is always the danger of troubles and hitches arising at critical moments, the effect of which is to spoil all the work and care expended in other directions and to leave on the guests an impression of failure more intense than the little lapses may justify. When there is a constant and considerable catering trade being done, on the other hand, it is possible to organize a special department for this work, with a qualified manager to attend properly to it, and much of the preparation for functions becomes then a matter of routine and the danger of mistakes is reduced to a minimum. When this branch is considerable, it is also possible to keep a large quantity of the necessary plant, the hire of which otherwise absorbs the greater part of the gross profit. There is a tendency amongst confectioners to take up this branch of the business very lightly and to make extraordinary sacrifices to secure orders; offering for work at a price that does not pay, in the hope that a business may be established that will ultimately be very profitable. This hope is very often frustrated, and a business started on low prices remains a low-price business, in which it is either impossible to make reasonable profits or to establish a reputation for quality. The caterer in the matter of price is often sorely tempted. People who entertain are generally more anxious to be grand than to be generous. It is quite a common practice for people getting up either a public or private function to obtain prices from several caterers, and to use the knowledge of the prices from one as a basis for beating down the prices of the others. The unfortunate man who ultimately obtains an order of this sort endeavours to make ends meet by economizing in all directions, and succeeds often enough in displeasing everyone. The hostess, if everything is not as it should be, is careful to let the guests know that Mr. So-and-So, the caterer, is doing the work, and that he is responsible for all shortcomings, but she is not so careful to let her guests know that the price she is paying is ridiculously small. The caterer in consequence is placed in a bad light before a great many people, with no chance of defence, and his cheap contract brings him no profit on its own account and destroys his chance of getting orders afterwards from those who are guests on that occasion. It is easy to explain away a fault in bread on occasions, or account for a defect in confectionery, but a set function of any kind is in such a glaring light that mistakes or faults however small are not readily forgotten or forgiven.

Folly of Cheap Estimates.

Meanness of Entertainers.

In making an estimate for outside work there is a tendency to neglect some items which ought always to be charged in estimates, even if the circumstances are such that they do not actually require to be paid for

at the moment. Thus, because a horse and van are kept for other purposes, it is assumed that the cartage for catering costs nothing, but this item, as well as the share of the vanman's time, especially if that is considerable, ought to be allowed for in the price quoted. Again, when a caterer has accumulated a large quantity of valuable "hire" he ought to allow in his estimate for the loan of this as a separate item from cost of material, as well as allowing a definite percentage for breakages and wear and tear. This may appear a counsel of perfection in view of the cutting prices now prevailing in catering work, but it is doubtful if it is worth doing at all unless all these items are allowed for. The capital required to procure a large plant and the breakages and losses entitle the caterer to a fair profit on this account alone, apart from the work done.

Calculate Cost of Transit.

There is no branch of the business in which quality is so much appreciated and in which it brings so good a return as in catering. This is true particularly of those functions for which a good price is charged and the guests are habituated to well-cooked meals, but even within the limits of cheap functions the best quality possible at the price should be supplied and the most careful service given. Caterers doing a steady business always keep a manager to see to all the details of the work, apart from the head waiter, whose business is to attend to the staff and the service, but whenever possible it is better that the master himself should attend at the commencement of the function or for that matter wait all through. Whether the master is himself an expert or not does not make so much difference as long as the staff is efficient, but customers recognize his presence as the real indication of his desire to please, and are themselves in all the better mood to be satisfied because of this courtesy. The waiters and attendants are then more alert and anxious to please, and should any little trouble arise the master can at once take steps to overcome it, whereas even a manager might hesitate if a question of expense were to arise, and would perhaps incline to let matters take their course rather than incur extra expense to set them right. But should a difficulty arise that cannot be mended, a word of explanation and apology from the master at the moment is always appreciated to an infinitely greater degree than an explanation and apology from a man in charge, and then a belated apology afterwards by letter from the master, who has also to confess that his knowledge of the trouble is only secondhand. The head waiter should be a man of good manners and presentable appearance, and above all he should be sober in his habits. Whenever the function is on profitable lines he should be given full control of the service staff, and his instructions as to procedure should be quite clear and definite; then when he has control he has also to accept responsibility. It is better, of course, when the caterer is himself an expert at the work and is capable of directing everything personally, but even when that is the case it is as well that the head waiter should be held

Need of Good Service.

Customers Prefer Attention of Principals.

responsible for the work that properly comes under his control, and such instructions as he is to be given should be quite definite before the function starts. This advice is given to prevent the clashing of instructions while the work is in progress, for a very little alteration of arrangement or a conflict of instructions is sufficient to spoil a scheme, which above all things should run smoothly. At the same time the caterer is better if he is not too much under the control of his own head waiter, as sometimes happens, but knows the business well enough to give instructions and to see that they are carried out, as head waiters with too much power and practically no financial responsibility are inclined at times to have extravagant notions as to service, &c., and may readily make functions that should show a reasonable profit quite unremunerative.

There is necessarily some diversity of opinion as to the size of staff to be employed for different functions. So far as table attendants are concerned, the general rule prevails that the better the price obtained the more generous can the scale of attendance be. For a cold collation at say about 2*s.* or 2*s.* 6*d.* per head, in marquees or other temporary structures, one smart waiter should be capable of attending to about twenty people; if the price obtained is not more say than 1*s.* 6*d.*, it is better to employ only waitresses, in charge of one or two smart waiters. As a rule, after the function is over, the waitresses, as part of their duties, assist in washing up and packing the hire. Dressed in neat black dresses, with white aprons and caps, waitresses give an air of lightness and brightness to a function that to the majority of people is more pleasing than the effect produced by waiter attendants, and waitresses are generally more obliging to guests, or at least have the appearance of being so, than the ordinary run of waiters who can be engaged for odd jobs, and there is wanting also that hungry look which the latter acquire when the end of the luncheon is approaching and the expectation of tips is near. For an affair of higher class, at which from 3*s.* to 5*s.* is charged, the number of waiters should then be not less than, say, one waiter to fifteen persons if the viands are cold, but if it is a hot luncheon or dinner, then one waiter to eight or ten persons is not too generous a provision.

Staff Required.

Proportion of Waiters to Guests.

When considerable quantities of china, glass, &c., have to be unpacked and repacked after use, the caterer ought to keep special cases for their transport, each box and lid having the nature and quantity of its contents neatly stencilled on it. This provision is necessary if the hire is the caterer's own property, but even if hired from a ball furnisher it looks better, and is a good advertisement if all dishes, &c., are taken to the function in the caterer's own boxes on which his name is neatly printed. To ensure reasonable safety it is better, whenever the price will allow, to place a porter in charge of all the packing and unpacking. The vanman attending the job, if at a considerable distance from home, is sometimes deputed to this work, as he has nothing to do while waiting to take back returns. Failing this, however,

Carting and Packing.

it pays to have a careful man in charge of this work, who can also assist at odd work in the intervals when the dishes, &c., are in use.

Taking Care of Plant.

Whenever convenient it is economical to make suitable arrangements to have the dishes at least carefully washed and dried at once before being packed away, this arrangement saving time and reducing the chances of breakage. It is not so easy to clean plate and cutlery, but these should be wiped dry and clean always before packing and properly cleaned as soon as possible after returning home, so that when required again they need only the minimum of work. The satisfaction of customers depends a great deal on the expedition and tidiness with which the utensils and all dishes and food are removed after a function is over, and it always pays to have a trained staff to attend to this part of the business. Yet while expedition is so essential, both in preparing for a social event and in removal of the goods, appearance of hurry or undue bustling should be carefully avoided. The people who attend these affairs are not themselves in a hurry, but are in a relaxed mood, and much racing about and bustling on the part of the attendants seems in consequence to be incongruous, and grates on the feelings of the guests. Quiet dispatch can be obtained if the staff is properly trained.

Counting the Guests.

As the caterer usually undertakes work at so much per person, it is necessary to be particular in counting the number actually served. When the affair is a purely private one the counting should be done without observation; this is quite easy when the number of guests is small. At functions where the guests move about and do not sit down together the counting is more difficult, but if the number is at all large a safe check can be obtained by the number who leave hats, &c., at the cloak rooms. At public functions of a high class, where tickets are not desirable, the numbers can be very quietly obtained by the head waiter or the caterer himself walking up and down the room noting only if there are any vacant chairs, the number previously placed in position before the guests arrived having been counted. When tickets are provided these should be of different colours for separate meals, or should the numbers be so large as to necessitate relays following each other, then each section should be provided with cards of different colours. The most expeditious and most satisfactory method of collecting tickets of this sort is before the guests enter the hall or marquee. All possible mistakes can then be rectified before the guests sit down to table, and much confusion may thereby be prevented.

Punctuality Necessary.

Amongst all the general points needing careful consideration none is so important as punctuality. A caterer's reputation may readily be ruined by keeping the guests waiting at table or outside the hall after the appointed time, although it may readily happen, in fact very frequently does happen, that those for whom the entertainment is provided keep the caterer waiting. When this happens all that can be done is to be, and appear to be, in perfect readiness at the proper

time, then by hints and courteous requests to those in charge expedite matters as much as possible. Whatever happens it is never wise to give any indication of temper, at least not while those providing the entertainment are near, although it may often be necessary to take a strong line and exhibit a good deal of firmness when departures from the contract engagement are proposed at the last moment, as they frequently are; but even this can be done in a manner not likely to give offence. To prevent any misunderstanding, however, it is better always to confirm a verbal understanding regarding a catering job by a formal note, setting out specifically the essential points, and requiring an acknowledgment from those providing the entertainment.

CHAPTER XLII

ESTIMATING AND HIRING

The very greatest care should be exercised in the giving of estimates in all classes of catering work, and the cost should be thoroughly gone into as far as possible beforehand. It is best, when cheap and good class work are both taken in hand, that two different qualities of hire should be kept in stock, one class for good work, and another for cheap. This secures a great saving on the wear and tear; and should hiring be necessary, get a price from the ball furnisher or hire agent for all goods required at so much per head for the lot that is requisite to carry out the work, as it generally works out much cheaper than at so much per dozen. Some of the quantities given here in the way of china and glass are estimated generously for breakages which may occur in transit or packing, as it is very awkward to run short some distance away from home, so as to replenish any of the china or glass that may come to grief. For cheap outdoor work it is better to substitute fancy paper serviettes for linen napkins, as they can be bought very cheaply, and may have your name printed on them in gold for large quantities for very little or no extra cost. Should you have very young children to cater for in the way of teas, you can substitute small mugs for cups and saucers, also calico tablecloths for linen or damask cloths.

Careful Estimating.

Expedients for Cheapness.

When a caterer has a reasonable expectation of a good many jobs during the entertaining season, it is much better that he should provide himself with as much catering plant as possible, even if it is only obtained a little at a time. Silver and plated goods, when not in use, serve to give the confectionery shop a rich substantial appearance, which to some extent supplies the air we call high-class, and for this ornamental effect even they serve a good commercial purpose. China, glass, &c., are less expensive and should be kept in stock sufficient for the

Keeping Own Hire.

kind and quantity of work generally done, then all extras can be hired from the ball furnishers in the usual way when any function is undertaken greater than the plant in hand will suffice for. Unless a caterer is able to keep a considerable quantity of plant of his own, there is not much profit to be made out of this class of work at the prices which now obtain if everything or nearly everything has to be hired. As, however, nearly all confectioner caterers have to hire at one time or another, and the goods required vary very much, we append here the general conditions to which the hire is subject and the prices charged by one of the leading London houses. These prices are somewhat higher than those charged by provincial hiring firms, but the comparative prices between one part of the plant and another are about the same. The prices given are for what may be considered high-class furnishing. The hirer may send his own vans for the goods and return them by the same means, and in this case the hirer is responsible for any loss or damage by breakage or otherwise that may occur in transit as well as that while the goods are in use. If, however, the hiring firm delivers and collects the goods, all damage or loss while in transit is at the risk of that firm. The cost in the latter case is of course considerably greater than when the hirer uses his own van and takes the extra risks. No specific charge is made for delivery or collection within a limit of four or five miles from the premises of the hiring firm, and the radius of free delivery is extended in proportion to the quantity of the hire. For country customers the hiring firm delivers free at any London terminus, the hirer paying all rail and delivery charges afterwards and taking all risks. When the goods are delivered by the furnisher's vans a delivery list of articles is sent with the goods, and a responsible person should be in attendance to receive these and sign for them. Goods short or broken on return are charged at cost price in addition to the hire.

Hire Prices.

Conditions of Hiring.

When the hire is for one day only—and the prices quoted are on that understanding—the goods are delivered one day and are due to be returned on the next. If past this time an extra charge is made. In the case of china, glass, furniture, linen, lights, &c., there is a reduction in the rate when the hire is for more than one day. Thus, for two or three days the charge is one and a quarter that for one day; for a week the charge is as one and a half days; for two weeks, as two and a half days; for three weeks, as three and a quarter days; for four weeks, as four days; and for longer periods, as two days for each month. For marquees, temporary rooms, &c., the list price is for one day; two consecutive days are charged at a sixth more than one day; for three days it is one-third more than one day; a week is charged as a day and a half, and for longer periods special quotations are given. The stipulation is made with regard to cutlery that it must be cleaned and dried before repacking for return, and the same regulation applies to all goods likely to be affected by wet. Any damage

Rates for Different Periods.

caused through mildew or rust is charged against the hirer. When marquees or temporary rooms are hired the furnishers send experienced men to erect and fit up these in any manner desired.

Reference is made above to cases in which the furnishers supply everything for a function at so much per head. The following lists show what is provided, and the prices charged by the London firm already alluded to.

Total Hire for Functions.

Goods Required for a Dinner for Twenty Persons

Charges for Hire Only—Best, at 4s. per Head; Ordinary, at 3s. per Head

18-ft. legged table.
Cloth for same.
20 table napkins.
20 doyleys.
4 glass cloths.
20 chairs.
80 meat plates.
60 pie plates.
20 cheese plates.
20 soup plates.
2 18-in. dishes.
2 14-in. dishes.
6 vegetable dishes.
4 entrée dishes and covers.
2 soup tureens.
4 sauce tureens.
2 salad bowls.
24 dessert plates.
20 coffee cups and saucers.
20 coffee spoons.
20 ice spoons.
4 salt spoons.
2 hot milk jugs.
2 cream jugs.
2 sugar tongs.
2 milk jugs.
2 sugar basins.
48 table knives.
24 dessert knives.
20 fish knives and forks.
20 fruit knives and forks.
2 pairs meat carvers and steel.
2 pairs poultry carvers.
1 pair fish carvers.
1 champagne nipper.
1 corkscrew.
20 champagne glasses.
20 claret glasses.
20 sherry glasses.
20 port glasses.
20 liqueur glasses.
12 ½-pt. tumblers.
4 water bottles and ups.
20 finger bowls.
20 hock glasses.
2 large flower epergnes.
4 small flower epergnes.
6 glass dishes.
4 salts.
8 vinegar cruets.
20 ice plates.
2 wine decanters.
2 claret decanters.
2 celery glasses.
40 table forks.
40 dessert forks.
20 dessert spoons.
12 table spoons.
1 gravy spoon.
2 salad spoons and forks.
2 soup ladles.
4 sauce ladles.
2 grape scissors.
2 butter dishes and knives.

Sit-Down Wedding Breakfast or Ball Supper for Twenty Persons

Charges for Hire Only—Best, at 2s. 6d. per Head; Ordinary, at 1s. 9d. per Head

Tables, 2 ft. for each person.
Rough covers for same.
Tablecloths.
20 napkins.
2 flower ornaments.
1 epergne (E.P.).
2 salvers.
2 candelabra (3 lights).
4 glass comports.
40 meat plates.
20 pie plates.
2 entrée dishes and covers.
12 dishes.
48 large knives (ivory haft).
40 large forks (King's).
20 small knives.
20 small forks.
4 pairs carvers.
12 table spoons.
20 dessert spoons.
10 salts (E.P.).
10 salt spoons.
2 decanters.
2 decanters (claret).
2 water bottles and glasses.
12 tumblers (½-pt.).
12 glass dishes.
20 fish knives and forks.
20 sherry glasses.
20 champagne glasses.
20 claret glasses.
4 mustards and spoons.
2 salad bowls (china).
2 salad servers.
12 ice spoons.
12 ice plates.
12 cups and saucers.
12 tea plates.
12 tea spoons.
1 claret bowl (china).
1 claret ladle.
1 soup tureen.
1 soup ladle.
12 soup cups.
1 sugar basin.
1 pair sugar tongs.
1 cream jug.
1 tea pot.
1 coffee pot.
12 champagne tumblers.
6 ½-pt. tumblers.
6 soda tumblers.
2 glass jugs.
12 wine glasses.

Buffet Breakfast or Supper List for Fifty Persons

Charges for Hire Only—Best, at 1s. 6d. per Head; Ordinary, at 1s. per Head

Tables (buffet and round).
Rough covers for same.
Cloths for same.
Chairs for round tables.
50 napkins.
1 epergne.
6 dessert stands.
2 E.P. urns.
4 E.P. salvers.
2 E.P. sugar basins.
2 sugar tongs.
2 milk jugs
2 candelabra.
24 table spoons.
40 dessert spoons.
24 tea spoons.
72 small forks.
72 small knives.
3 pairs carvers.
6 knives and steel forks for small carvers.
6 salts and ladles.
2 mustards and ladles.
4 breakfast cruets.

Buffet Breakfast or Supper List for Fifty Persons—(*Continued*)

36 champagne glasses.
40 champagne tumblers.
24 tumblers.
6 decanters.
6 water bottles
100 plates.
20 meat dishes.
24 cups and saucers.
36 ice plates.
36 ice spades.
10 glass dishes for jellies.
6 comports.
3 glass jugs.
24 tea plates.
24 soup plates or cups.
1 soup tureen.
1 soup ladle.

Wedding Reception for Twenty Persons

Charges for Hire Only—At 1*s.* 3*d. per Head*

High buffet table (10 ft. by 3 ft.).
Cloth for same.
2 glass cloths.
6 china comports.
20 dessert plates.
40 tea plates.
18 tea cups and saucers.
2 hot-milk jugs.
12 coffee cups and saucers.
2 cream jugs.
2 bread and butter plates.
1 slop basin.
2 table knives.
20 fruit knives and forks.
12 champagne tumblers.
6 ½-pt. tumblers.
2 flower epergnes.
2 glass dishes.
20 ice plates.
2 water jugs.
1 water bottle.
30 tea spoons.
20 ice spoons.
2 sugar basins.
2 milk jugs.
2 sugar tongs.
1 pair grape scissors.
1 salver.
2 E.P. epergnes.
1 small tea urn.
1 small coffee urn.

Cost of Hiring Plated Ornaments, etc., Separately

Bacon dishes (hot water), each 2*s.*
Basket, bread and cake, each 1*s.* to 2*s.*
Bowls, salad, E.P. mounts, each 1*s.* 6*d.*
Salad servers, E.P. mounts, per pair 6*d.*
Bride cake stands, each 2*s.* to 7*s.* 6*d.*
„ saw and knife, each 6*d.* and 1*s.*
Butter dishes, each 1*s.*
Candlesticks, &c., each 1*s.* 6*d.* to 3*s.* 6*d.*
„ with 5 to 13 lights, per light 9*d.*
Centre pieces, each 5*s.* to 7*s.* 6*d.*
Claret jugs, E.P. mounts, each 1*s.*
Coffee pots, each 1*s.* and 1*s.* 6*d.*
Cream jugs, each 8*d.*
Dessert stands, each 3*s.* to 5*s.*
Epergnes for fruit and flowers, each 2*s.* 6*d.* to 5*s.*
Frames, cruets, &c., each 1*s.* to 3*s.*
Ice pails and stands, each 1*s.* to 7*s.* 6*d.*
Kettles, with spirit lamps, each 2*s.* 6*d.*
Knife rests, per pair 3*d.* and 6*d.*
Labels for wines and spirits, per doz. 2*s.* 6*d.*
Loving cups, each 1*s.* 6*d.* to 2*s.* 6*d.*
Milk jugs, each 8*d.*
Mustard pots, each 3*d.* and 6*d.*
Nut crackers, E.P., each 3*d.*

COST OF HIRING PLATED ORNAMENTS, ETC.—(*Continued*)

Salt cellars, each 6*d.*
Salvers (10 to 24 in. diameter), each 8*d.* to 3*s.*
Soup cups, per doz. 4*s.*
Specimen vases, per doz. 6*s.* to 8*s.*
Sugar basins, each 8*d.*
Tankards for champagne or claret cup, each 1*s.* 6*d.* to 2*s.*
Tea pots, each 1*s.* and 1*s.* 6*d.*
Toast racks, each 6*d.*
Urns, plated, each 2*s.* 6*d.* to 6*s.*
,, tin, with lamp, each 1*s.* 6*d.* to 2*s.*
Champagne nippers, per doz. 2*s.*
Dishes, meat, each 6*d.* to 2*s.* 6*d.*
,, well, each 3*s.* to 3*s.* 6*d.*
,, venison, each 4*s.* to 6*s.*
,, side or entrée, forming 8 plain, per set 4*s.* to 6*s.*
,, vegetable, with warmers and divisions, each 2*s.*
,, soufflée, each 1*s.*
Forks, bread, per doz. 4*s.*
,, dessert, per doz. 8*d.* to 1*s.*
,, pickle, per doz. 1*s.* 6*d.*
,, table, per doz. 10*d.* to 1*s.* 2*d.*
Grape scissors, per pair 4*d.*
Knives, fish carver and fork, per pair 9*d.* and 1*s.*
,, fish eating, with forks, per pair 2*s.* and 2*s.* 6*d.*
,, fruit, with forks, per pair 2*s.* and 2*s.* 6*d.*
,, butter, each 2*d.*
Ladles, punch, each 4*d.*
,, salt and mustard, per doz. 4*d.* to 8*d.*
,, soup, per doz. 4*s.* to 6*s.*
,, sauce, per doz. 1*s.* 6*d.* to 2*s.* 6*d.*
,, sugar, per doz. 3*s.* to 4*s.*
Sauce boats, each 6*d.*
Sugar sifters, per doz. 4*s.*
Spoons, gravy, per doz. 2*s.* 6*d.* to 3*s.*
,, table, per doz. 10*d.* to 1*s.* 2*d.*
,, dessert, per doz. 8*d.* to 1*s.*
,, tea or ice, per doz. 4*d.* to 8*d.*
,, coffee, per doz. 6*d.*
,, fruit, per doz. 4*s.*
Spoons, jam, per doz. 1*s.*
Spoon warmer, each 1*s.*
Tongs, asparagus, each 6*d.*
,, ice, each 4*d.*
,, sandwich, each 6*d.*
,, sugar, each 2*d.* and 3*d.*
Knives, table, per doz. 6*d.* to 1*s.* 2*d.*
,, dessert, per doz. 6*d.* to 1*s.*
Salad bowls, glass, per doz. 6*s.*
Celery vases, per doz. 4*s.* to 6*s.*
Champagne saucer, per doz. 1*s.* and 1*s.* 6*d.*
,, goblet, per doz. 9*d.* and 1*s.*
,, tumblers, per doz. 6*d.* and 9*d.*
Comports, per doz. 3*s.* to 4*s.* 6*d.*
Clarets, per doz. 6*d.* and 9*d.*
Cruets, mustard, pepper, and vinegar, per doz. 1*s.*
Custard, per doz. 6*d.*
Decanters, quarts, 4*s.* to 12*s.*
Dishes, round or oval glass, per doz. 1*s.* 6*d.* to 5*s.*
Flower troughs, per doz. 2*s.*
Finger glasses, per doz. 1*s.* and 1*s.* 6*d.*
Hocks, per doz. 6*d.* and 9*d.*
Jelly glasses, per doz. 6*d.*
Jugs, claret, plain, each 6*d.* to 9*d.*
,, ,, cut, each 9*d.*
,, milk and cream, per doz. 2*s.*
Liqueurs, per doz. 6*d.* and 9*d.*
Tumblers, per doz. 6*d.* and 9*d.*
,, soda, per doz. 6*d.* and 9*d.*
Water bottles, per doz. 2*s.* and 4*s.*
Wines, ports, and sherries, per doz. 6*d.* and 9*d.*
Cheese stands, each 6*d.*
Cups and saucers, per doz. 6*d.* to 1*s.*
Dessert centres, per doz. 6*s.*
,, plates, per doz. 8*d.* and 1*s.*
Dishes, butter, each 3*d.*
,, cheese, each 6*d.*
,, game pie, each 6*d.*
,, pie, per doz. 1*s.*
,, raised pie, each 6*d.*
Flower pots, ornamental, per pair 1*s.*
,, majolica, each 5*s.*
,, pedestals for same, each 2*s.* 6*d.*

Cost of Hiring Plated Ornaments, etc.—(*Continued*)

Jugs, each 2*d.* to 1*s.* 6*d.*
„ hot water, per doz. 3*s.*
„ milk, per doz. 1*s.* and 2*s.*
Menu holders, per doz. 1*s.* 6*d.*
Mugs, per doz. 6*d.* to 9*d.*
Plates, per doz. 6*d.* to 2*s.*
Punch bowls, each 1*s.* and 2*s.* 6*d.*
Slop and sugar basins, per doz. 1*s.* and 2*s.*
Tea pots, Japanese, each 4*d.* and 6*d.*
Toilet ware, per set 3*s.* and 5*s.*

Cost of Hiring Tables, Seats, and Chairs

Chairs, Austrian, per doz. 4*s.* to 6*s.*
„ basket, per doz. 18*s.*
„ „ coloured cane, per doz. 30*s.*
„ fancy coloured pillows, per doz. 6*s.*
„ concert, leather seat, per doz. 6*s.*
„ dining-room, leather, per doz. 18*s.* to 24*s.*
„ garden, high back, per doz. 5*s.*
„ „ low back, per doz. 4*s.* 6*d.*
„ saddlebag easy, each 2*s.* 6*d.* and 5*s.*
„ tapestry easy, each 5*s.* to 10*s.*
Cushions, damask, for chairs, per doz. 2*s.* 6*d.*
„ plush, for chairs, per doz. 6*s.*
Forms, plain wood, per ft. run 1*d.*
Rout seats, common, per ft. run 1½*d.*
„ walnut, folding fibre seat, per ft. run 2*d.*
„ cane seat, best, per ft. run 2*d.*
„ white and gold, upholstered in silk, per ft. run, 1*s.* and 1*s.* 6*d.*
„ cushions, damask, per ft. run 1*d.*
Rout seats, cushions, velvet, spring seat, per ft. run 4*d.*
Tables, deal, on trestles, with rough cover, per ft. 3*d.* to 6*d.*, according to width.
„ on legs, per ft. 6*d.* to 8*d.*
„ card, for progressive whist, covered green, each 1*s.*
„ „ Lyle's patent, each 2*s.*
„ „ folding, mahogany, 3 ft. diameter, each 2*s.* 6*d.*
Couches, each 10*s.* 6*d.* to 21*s.*
Cloak tickets, per 100 1*s.*
Curtains, per pair 2*s.* 6*d.* to 13*s.*
Hat racks, 5-shelf, per ft. 1*s.* to 1*s.* 3*d.*
„ with 18 pegs, per rack 6*s.*
Looking glasses, each 5*s.* to 45*s.*
Screens, each 5*s.* to 10*s.*
Dancing cloths, per sq. yd. 4*d.* to 9*d.*
Baize, per sq. yd. 4*d.* to 8*d.*
Carpet strips, per yd. 4*d.* to 6*d.*
Cocoanut matting, per sq. yd. 3*d.*
Table cloths, damask, per yd. 4*d.*
„ common, per yd. 3*d.*
Table slips, per yd. 2*d.*
Butlers' tray cloths, per doz. 3*s.*
Tray cloths, per doz. 3*s.* to 12*s.*
Serviettes, fine damask, per doz. 1*s.* 6*d.*
„ common, per doz. 10*d.*
Doyleys, coloured or white, per doz. 1*s.*

In addition to the list here given, caterers' furnishers are open to provide anything for the kitchen in the way of cooking utensils, also for the fitting up of stables or of bedrooms, and will supply bands and entertainers of any kind.

CAPACITY FOR VARIOUS FUNCTIONS, AND PRICES OF HIRE, OF MARQUEES WITH SQUARE ENDS WITHOUT DECORATIONS

Size of Marquee.	To Seat at Table.	To Dance.	For a Reception.	For a Concert, including Platform and Gangways.	Plain Marquee.
					£ s. d.
20 × 10	16	—	18	30	1 15 0
25 × 15	24	33	28	56	2 0 0
30 × 15	32	40	34	72	2 7 6
35 × 15	35	48	40	88	2 15 0
30 × 20	56	53	44	88	2 17 6
40 × 20	82	70	60	132	3 10 0
50 × 20	106	88	74	176	4 5 0
60 × 20	130	106	88	220	5 0 0
35 × 25	70	75	62	126	3 10 0
40 × 25	80	88	73	154	4 0 0
45 × 25	96	100	84	182	4 10 0
55 × 25	120	122	102	238	5 5 0
65 × 25	135	144	120	280	6 0 0
40 × 30	112	106	88	187	5 0 0
50 × 30	142	133	110	255	5 10 0
60 × 30	186	160	133	323	6 0 0
70 × 30	220	186	155	374	7 0 0
90 × 30	295	240	200	493	8 0 0
110 × 30	370	293	244	612	10 0 0
60 × 40	240	215	178	360	8 0 0
80 × 40	340	285	236	500	9 10 0
100 × 40	440	355	296	640	11 10 0
120 × 40	540	426	354	780	13 10 0
140 × 40	640	500	414	920	15 10 0
65 × 45	330	260	216	456	8 10 0

CHAPTER XLIII

ARRANGING THE TABLES

In regard to table arrangement it has often been discussed whether horseshoe or square blocks are best for working at, but a great deal depends upon the space or room available to cater in, also upon the width of table. The most convenient width is about 3 ft., as the guests can converse with those on the opposite side more freely, and it takes up much less room than wider sizes. The writer was once a guest at a very fine dinner given at one of our very high-class modern hotels to some very prominent chefs and others connected with catering, and when the dinner was served he was struck with the room as not being a very convenient one. It was a long

Breadth of Tables.

narrow room with a horseshoe table and service from the very far end. The attendance was not very good, as the waiters were very much in one another's way, and many of the guests had to wait a long time before being served. The writer expected to see the affair carried through in much better style at this hotel. Its service kitchen should have been much nearer the room where the banquet was held, and there should have been a more suitable dining-room. In outdoor catering, however, one has to put up with all kinds of places and to do the best possible under the circumstances. If one has to erect tents or temporary rooms, and if not tied down to price, one can have just what suits oneself, but when confined to ordinary rooms or halls a good deal of trouble may be experienced.

Caterers' Difficulties.

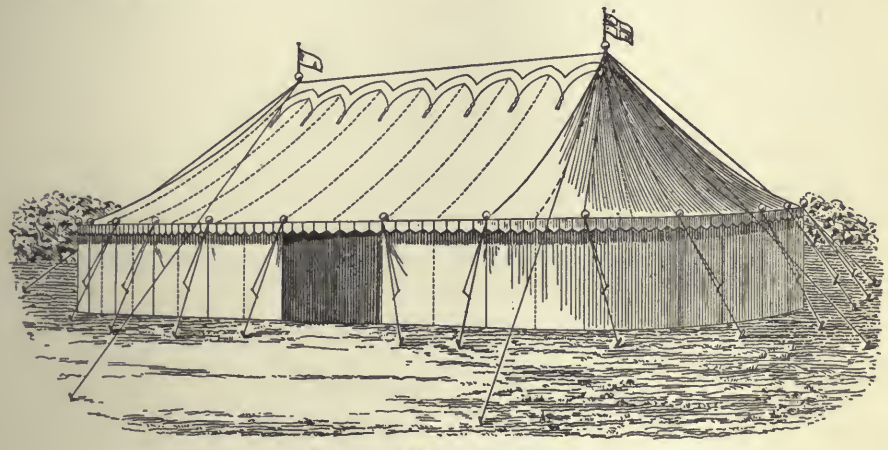


Fig. 144.—A Marquee for Catering

Tents and temporary rooms have to be estimated for as an extra item. They can be put up at different prices. You can have them very elaborately fitted up with electric light and parquet floor, without nail or screw on the surface.

Temporary Rooms, Tents, &c.

In planning the tables for a sitting-down function of any kind the allowance for each person, if the capacity of the room will permit, is about 2 ft., but as both sides of the table can usually be occupied the allowance is really 1 ft. per person in length of table. Thus a table 20 ft. long, the ends of which are not occupied, should comfortably seat twenty persons. The next important matter is to arrange for the service. It is always best to have the kitchen as near as possible to the room where the dinner or luncheon is to be if the dishes are hot; if it is a cold collation, a carving table placed at one end of the dining-room or tent, and of sufficient length to accommodate all the dishes, is the most suitable arrangement, or if the room is crowded with tables, then the nearest convenient room can be occupied for service purposes. When the number to be catered for is very large, it is better to have

Table Room for Each Person.

Carving and Service Tables.

carving tables at each end, or in rooms or tents at both ends of the place in which the luncheon is to take place. The arrangement of tables must of course depend on the number of persons. For a small number, say twenty persons, a long table about 20 ft. long is suitable, the host or chairman occupying one end of the table. When the number is about thirty, and the room long enough, a table planned in the form of a large T (fig. 145) is very convenient: the cross table or the long one can of course be arranged to fit the dimensions of the room.

Suitable Arrangement for Small Parties.

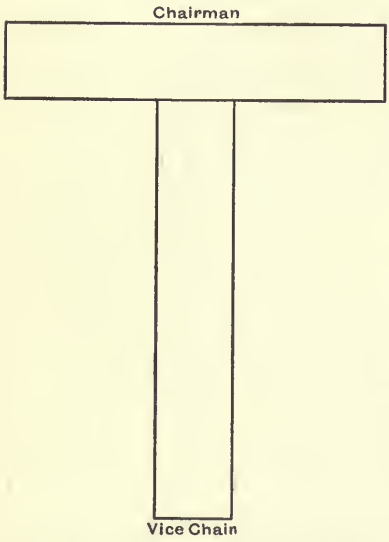


Fig. 145.—Arrangement of Tables for about Thirty Persons

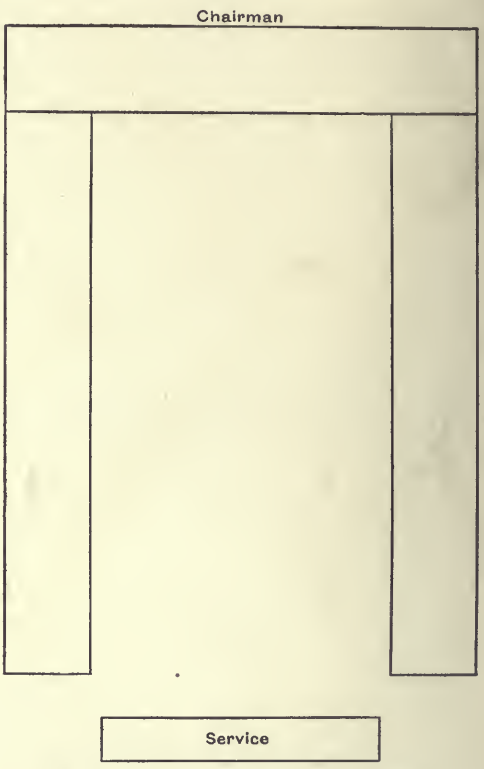


Fig. 146.—Arrangement of Tables for about Sixty Persons

When the number of guests is still larger, the forms as indicated in figs. 146 and 147 might be suitable, the service in one case being in another room, in the other the viands being served from a separate table in the same room. The service door is shown in fig. 147 as in the centre of the room, which is the most convenient when there is only one door, but it may be nearly as convenient if at one side. It is better, however, when there is more than one door, that they should be at the ends away from the head of the table, although that is naturally the table at which service begins, and if possible the chairman should never be placed right in front of the service door, or if this is unavoidable a large draught screen should stand in front of the door.

Plan for about Sixty Persons.

An arrangement very suitable for a large oblong room or a long tent to

INTERIOR OF TENT FITTED WITH HORSE-SHOE SUPPER TABLE

INTERIOR OF TENT FITTED WITH BUFFET AND ROUND TABLES

Fig. 147.—Arrangement of Tables for about Sixty Persons: Service from Outside

seat about two hundred persons is indicated in fig. 148. Service doors are shown, but if the function is in a tent it is more convenient to have the carving and service table along the side of the tent at which are the free ends of the short tables, or if there are two service tables, then one at each side parallel with the short tables. This latter arrangement when possible is really the most convenient for a quick and efficient service. Another arrangement suitable for a tent luncheon is indicated in figs. 149 and 150. In one case the position for the chairman is shown at the end of one table, in the other at the middle of what will of course be the top table.

Service Position for Large Tent Party.

Fig. 151 is intended to show an arrangement of narrow tables suitable for a function for which the price obtained is low and the accommodation stinted. In this case the tables may be not more than 18 in. wide, or if some appearance of good style must be provided, then they may be about 2 ft. wide. A particularly

Arrangement for Large Party in Small Space.

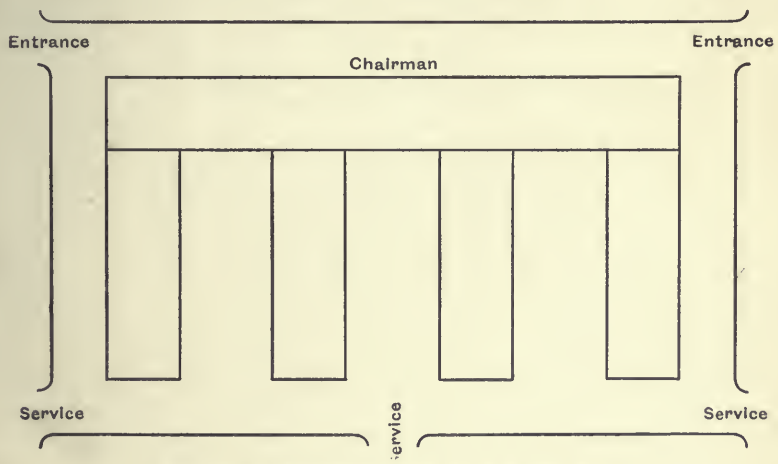


Fig. 148.—Arrangement of Tables for Large Tent Party

cosy arrangement for a good-class function is shown in fig. 152, in which a number of short tables are arranged

Cosy Arrangement of Tables.

in two series in the centre with a long table top and bottom. Service doors are shown where they would be most convenient, but the caterer has

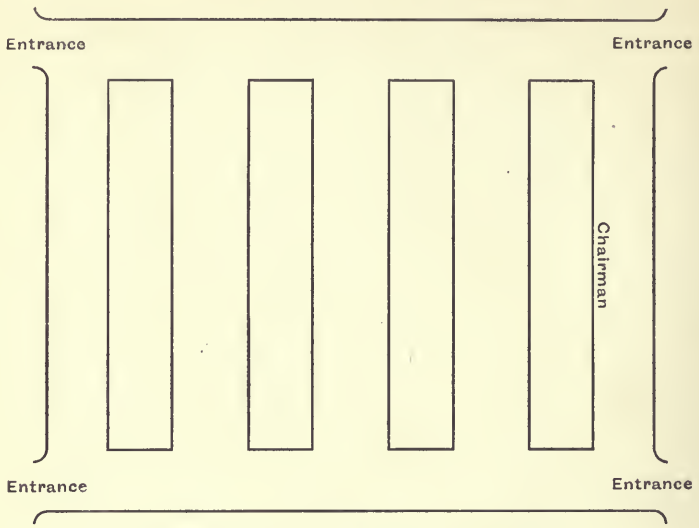


Fig. 149.—Arrangement of Tables for a Tent Luncheon

generally to accommodate himself to arrangements much less convenient. Those plans all show straight tables, but it is quite easy, though a little

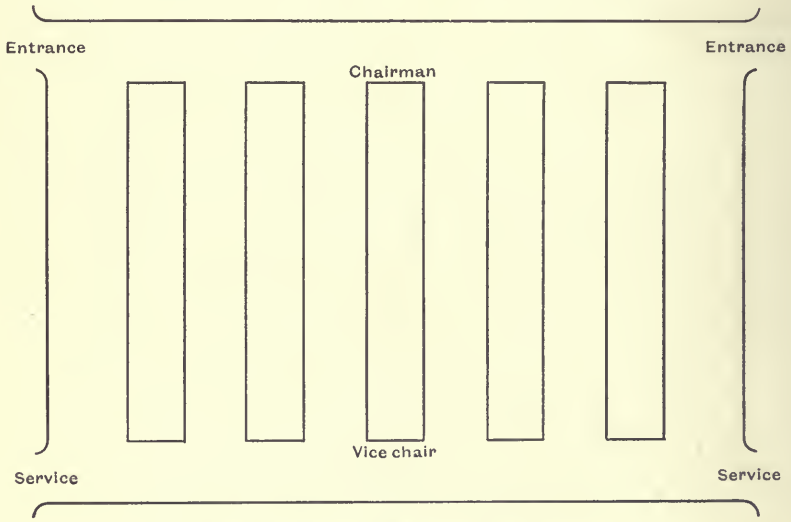


Fig. 150.—Arrangement of Tables for a Tent Luncheon

more expensive, to have the tables arranged in concentric circles, crescents, or horseshoe shapes.

For receptions at which the refreshments provided are only light, the

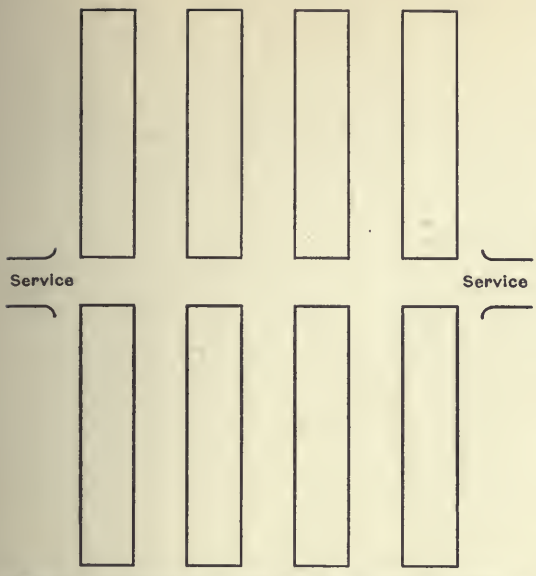


Fig. 151.—Arrangement of Tables for Large Party in Small Space

usual plan is to have a long buffet table erected along one side or one end of the room or tent, according to the number of guests to be provided for, and then the guests are expected for the most part to help themselves. If there are a number of small tables arranged about the room at which the guests distribute themselves, the refreshments to be taken to them by waiters or waitresses, then a smaller buffet table, which is in fact only a service table, is required, and it may be placed in any convenient position, where the stock of viands for the whole service can be kept handy. When the space for the buffet table for standing-up refreshments is very limited, the shape giving the maximum of space to the guests on the outside of the buffet is that of an arc of a circle against the wall of the room (fig. 153).

Buffet System for Light Refreshments.

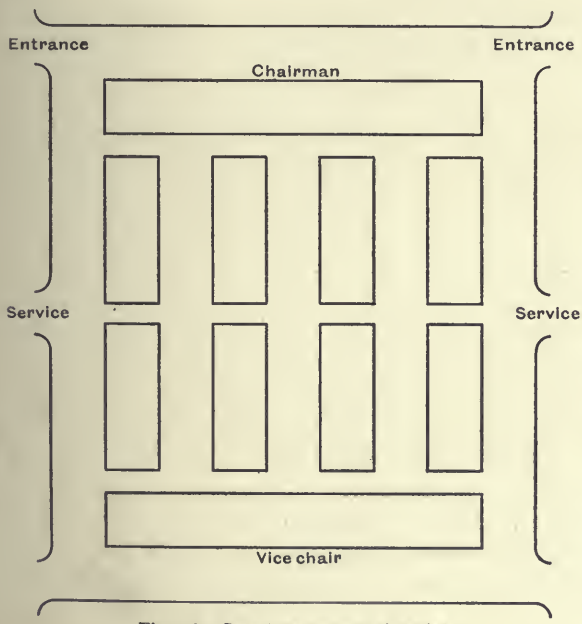


Fig. 152.—Cosy Arrangement of Tables

When the reception or other function is arranged so that the guests can either obtain refreshments at the buffet or be attended to at small tables placed about the room, on the lawn, &c., the circular form of table is still the most convenient, and looks ornamental with a smaller outlay for decorations than a straight table. A circular table of this kind can, of course, be easily made in sections; only the first cost is a little greater than that of a quite plain one.

Circular Tables.

At a ball supper, when the refreshments have to be served in the room where the dancing takes place, a convenient corner is the best place in which to erect the buffet, and then the circular form of table is the least obtrusive and most convenient for the guests, and provides the maximum of space for the attendants. When a number of small tables have to be arranged about a large room or tent or outside, it makes too formal an appearance to have all the tables the same shape and size or arranged in too regular order. Yet it is much better to give the appearance of variety by difference in the shape and size of tables than by irregularity in their distribution. One form in any case should be carefully maintained—the passages radiating from the service rooms between the tables should be as straight as possible, so as not to interfere with the work of the waiters or waitresses any more than necessary. Informality and the sense of ease can be equally well obtained by having the cross lines of tables irregular. Arranging them around the wall of the room, with, of course, a convenient space between wall and tables, and with the service as much as possible next the wall, is a suitable arrangement that interferes very little with the freedom of the guests in the centre. Nothing conduces more to the success of a social function than care in arranging all such little details as these. The great aim of the caterer is to give satisfaction to his customers, and after quality of the viands has been secured a quick and smooth-working service is the next factor in the problem, and nothing conduces so much to smooth working as a well-thought-out and deliberately executed table plan.

Arrangement of Small Tables.

Value of Straight Passages.

Fig. 153.—Arc Buffet Table

Importance of Careful Table Planning.

CHAPTER XLIV

ESTIMATING FOR TEAS, LUNCHEONS, BALL SUPPERS, ETC.

The following series of estimates have been carefully worked out from catering work actually undertaken in the course of business by an experienced London caterer. In a business so varied there is much room for diversity of practice with regard to the amount of furnishing, food, or attendance to be provided; but it must be carefully kept in mind that in the stress of competition profits are now comparatively small, and economy must be practised in every detail if the account is to be balanced on the right side. It is a decided weakness with those newly entering the catering business to strain after showy effects, and to

Small Margins.

deliberately forgo profit for this purpose, or by very loose estimating to forgo profit without knowing it. Want of profit either way is fatal. If a great deal more than value is provided on one occasion at the expense of the caterer, a precedent is created that is not forgotten by the customer, and equal value is required on all subsequent occasions for the same price. Once an extravagant scale is established, there is the greatest difficulty in afterwards reducing it to a paying limit, because people think nothing of absolute value or even of prices, but make comparisons of one occasion with another, and are unforgiving at the least falling off. It is better to begin the catering business, like all others, in a sound business way, and endeavour to secure a fair if only a small profit on every undertaking, commending yourself to customers rather by prompt attention to enquiries, by the greatest care in the preparation of everything, by punctuality and efficient service, and by personal supervision, than by providing goods past the price obtained.

The estimates here given might be extended to include hundreds of functions which may vary in several details, but sufficient is given to show the general lines, and anyone can make the needed alterations to fit the special occasions. These details show more clearly than a mere expression of opinion how needful it is that a considerable quantity of furnishing should be bought by the caterer; otherwise, if hire has to be paid on each occasion, the profit would be entirely absorbed.

All kinds of functions must be provided for, and some of the plain affairs if carefully done are quite as profitable as those designated high-class. Estimates are here made out showing furnishings required for teas from 9*d.* per head, to dinners at 6*s.* without wines; and a series of typical menus will be given for similar functions at the usual run of prices.

ESTIMATE FOR A TEA FOR 200 PERSONS AT 9*d.* PER HEAD, INCLUDING HIRE, CARTAGE, ATTENDANCE, ETC., AND THE PROFIT

Hire needed

156 ft. tables and trestles.
56 yd. table cloths.
300 ft. seating.
220 cups and saucers.
200 tea spoons.
220 small plates.
50 large plates.
48 basins.
48 milk jugs.
6 tea urns.
12 large tea pots.
12 large glass cloths.
6 large jugs.
2 large urns or milk churns, to make tea in.

Cost of Materials.

	£	s.	d.
24 gal. tea			
16 qtn. bread at 6*d.*	0	8	0
8 lb. butter, 1*s.*	0	8	0
3 lb. tea, 1*s.* 6*d.*	0	4	6
20 qt. milk, 3*d.*	0	5	0
40 lb. cake (mixed), 6*d.*	1	0	0
Carry forward ...	2	5	6

	£	s.	d.
Brought forward ...	2	5	6
12 lb. biscuits, 6*d.*	0	6	0
18 lb. jam	0	5	0
144 small buns (jammed and cut in two)	0	5	0
18 lb. sugar	0	3	0
Plants for tables...	0	5	0
10 attendants	1	10	0
Cartage	0	10	0
	5	9	6

	£	s.	d.
Receipts:—Tea for 200 persons at 9*d.*	7	10	0
Cost (excluding hire) ...	5	9	6
Gross Profit	2	0	6

ESTIMATE FOR A TEA FOR 200 PERSONS AT 1*s.* PER HEAD, GIVING QUANTITIES FOR HIRE, CARTAGE, AND GOODS REQUIRED, ETC., WITH PROFITS

Hire needed

156 ft. of tables and trestles.
56 yd. table cloth (calico).
300 ft. of seating (forms).
220 cups and saucers.
200 tea spoons.
220 small plates.
50 large plates for bread, butter, and cake.
48 basins.
48 milk jugs.
6 large milk jugs.
6 tea urns.
12 tea pots.
24 salts and spoons.
24 jam glass dishes.

Cost of Materials.

	£	s.	d.
24 gal. of tea			
12 qtn. bread	0	6	0
8 lb. butter	0	8	0
3 lb. tea at 1*s.* 6*d.*	0	4	6
24 qt. milk	0	6	0
30 lb. sugar	0	3	9
40 lb. cake, 6*d.*	1	0	0
8 lb. biscuits, 6*d.*	0	4	0
18 lb. jam	0	5	0
12 bd. cress	0	0	9
24 lettuce	0	2	0
Salt	0	0	3
10 attendants at 3*s.*	1	10	0
Cartage	0	10	0
Plants for table	0	4	0
	5	4	3

	£	s.	d.
Receipts:—200 persons at 1*s.* ...	10	0	0
Cost (excluding hire) ...	5	4	3
Gross Profit	4	15	9

Estimate for a Luncheon for 200 Persons at 2*s.* per Head, including Hire, Cartage, etc., and the Profits

Hire needed

156 ft. tables and trestles.
56 yd. table cloths.
200 seats.
200 paper serviettes.
6 table ornaments.
12 table spoons.
200 dessert spoons.
200 table forks.
200 small forks.
200 table knives.
200 small knives.
6 pairs carvers.
48 mustards and spoons.
48 salts and spoons.
200 tumblers.
18 water bottles.
12 dishes.
220 plates.
220 small plates.

Cost of Materials.

	£	*s.*	*d.*
50 lb. roast beef at 10*d.*	2	1	8
24 lb. boiled beef, 9*d.*	0	18	0
24 lb. ham, 8*d.*	0	16	0
4 veal-and-ham pies	1	4	0
Salad (various)	0	6	0
12 fruit tarts, 2*s.* 6*d.*	1	10	0
10 qt. custard, 2*s.*	1	0	0
12 lb. cheese	0	8	0
6 lb. butter, 1*s.* 2*d.*	0	7	0
4 rolls celery	0	4	0
250 rolls	0	10	6
Salad dressing	0	6	0
2 pt. vinegar	0	0	6
12 waitresses, 3*s.*	1	16	0
2 carvers, 5*s.*	0	10	0
Flowers and plants for table	0	7	0
	12	4	8

	£	*s.*	*d.*
Receipts:—Luncheon for 200 persons at 2*s.*	20	0	0
Cost, without hire	12	4	8
Gross Profit	7	15	4

Estimate for a Plain Dinner for 500 Working Men at 2*s.* per Head

Menu

Roast ribs of beef.
Horse-radish sauce. Roast leg mutton.
Boiled and baked potatoes.
Brussels sprouts. Plum pudding. Cheese.
Butter. Dinner rolls.
Water cress.

Hire needed

440 feet tabling.	120 vegetable dishes.	500 small knives.
150 yd. table cloths.	5 gravy tureens.	10 pairs carvers.
1000 meat plates.	5 sauce tureens.	500 large forks.
500 pudding plates.	50 peppers.	500 small forks.
500 cheese plates.	50 mustards.	500 dessert spoons.
24 meat dishes.	50 salts and spoons.	500 tumblers.
48 soup plates for cress.	500 large knives.	500 paper serviettes.

Cost of Materials

	£	*s.*	*d.*
220 lb. beef	7	15	10
120 lb. mutton	4	5	0
Meat for gravy	0	3	0
3 bush. potatoes	0	18	0
96 lb. Brussels sprouts	0	12	0
30 bunches water cress	0	2	8
700 rolls	1	5	0
20 plum puddings	3	0	0
5 qt. brandy sauce	0	5	0
28 lb. cheese	0	14	0
8 lb. butter	0	9	4
500 serviettes	0	2	6
Mustard, pepper, and salt	0	5	0
25 waitresses	3	2	6
6 porters	1	4	0
10 carvers	2	0	0
Hire plants for table	0	6	0
Cartage	1	10	0
	27	19	10

	£	*s.*	*d.*
Receipts:—500 persons at 2*s.* ...	50	0	0
Cost, without hire ...	27	19	10
Gross Profit	22	0	2

Note.—Profit, less for hire; if own hire, 10 per cent ought to be allowed in the estimate for wear and tear to pay for same, breakages, and upkeep.

ESTIMATE FOR A DINNER FOR 100 PERSONS AT 3*s.* PER HEAD. INCLUDING ALL GOODS AND HIRE, ATTENDANCE, CARTAGE, ETC.

If with Poultry 6d. per Head Extra

Menu

Soups.
Clear soup. Tomato soup.
Fish.
Boiled cod and oyster sauce.
Roast ribs of beef. Boiled mutton, caper sauce.
Baked and boiled potatoes.
Brussels sprouts. Mashed turnips.
Damson tart and custard.
Cheese and celery.

Hire needed

75 ft. tables and baize or covers.	100 large knives.
28 yd. table cloths.	100 small knives.
156 ft. seats or 100 chairs.	100 large forks.
100 paper serviettes.	100 small forks.
110 soup plates.	100 fish knives and forks.
350 meat plates.	1 pair fish carvers.
6 meat dishes.	4 pairs meat carvers.
110 cheese plates.	2 soup ladles.
4 sauce boats.	24 salts and spoons.
8 celery vases.	100 tumblers.
2 soup tureens.	100 dessert spoons.
18 vegetable dishes.	24 table spoons.
6 cruet frames.	

Cost of Materials

	£	s.	d.
2½ gal. clear soup 3 „ tomato soup			
12 lb. leg beef	0	6	0
6 „ tomatoes	0	2	0
Cow heel and bones for stock ...	0	2	0
Vegetables and seasoning	0	0	6
48 lb. cod	0	16	0
4 doz. oysters	0	2	0
1 gal. sauce	0	2	0
20 lb. ribs of beef	0	16	8
20 „ leg mutton	0	16	8
50 „ potatoes	0	4	2
1 bush. sprouts	0	5	0
3 lb. caper sauce	0	2	0
6 heads turnips	0	1	6
6 damson tarts	0	12	0
4 qt. custard	0	8	0
6 lb. cheese	0	4	0
3 „ butter	0	4	0
1½ rolls celery	0	1	6
150 rolls	0	5	0
2 lb. castor sugar	0	0	5
Cruets, salt, &c.	0	3	0
Wages, 7 waiters	1	15	0
„ 2 carvers	0	12	0
Hire of plants and flowers ...	0	7	0
Horse and van	0	10	0
	8	18	5

	£	s.	d.
Receipts:—100 at 3*s.*	15	0	0
Cost, without hire ...	8	18	5
Gross Profit	6	1	7

Estimate for a Dinner for 100 Persons at 6s. per Head

Menu

Spring soup. Tomato soup.
Turbot. Hollandaise sauce. New potatoes.
Escalopes of veal milanaise.
Roast haunch mutton. Cauliflowers.
Potato croquettes.
Roast chicken. Dressed salad. Bread sauce.
Potato straws.
Apple charlotte. Ice pudding.
Cheese. Dessert.

Hire needed

80 ft. of tables and covers.	20 entrée dishes.	4 soup ladles.
33 yd. table cloths.	10 cruet frames.	8 sauce ladles.
100 chairs.	300 large knives.	24 salt cellars.
100 napkins.	120 small knives.	24 salt ladles.
4 soup tureens.	6 pairs carvers.	100 claret glasses.
108 soup plates.	100 fish knives and forks.	100 hock glasses.
400 meat plates.	100 Dessert knives and forks.	100 champagne glasses.
200 pudding plates.	3 pairs fish carvers.	100 finger bowls.
12 meat and fish dishes.	36 table spoons.	100 dessert plates.
8 sauce boats.	100 ice spoons.	3 epergnes.
16 vegetable dishes.	300 large forks.	12 fruit stands.
8 salad bowls.	120 small forks.	8 assorted candelabra.

Cost of Materials.

	£	s.	d.
12 qt. spring soup, 12 lb. stock meat	0	6	0
Bones, &c.	0	2	0
8 qt. tomato soup, vegetables and seasoning ...	0	1	0
8 lb. tomatoes	0	2	8
Sundries	0	1	0
40 lb. turbot	1	13	4
3 qt. hollandaise sauce	0	2	6
10 lb. new potatoes	0	1	3
14 lb. veal cutlets	0	14	0
4 qt. sauce milanaise	0	4	0
Sundries	0	3	0
40 lb. haunch mutton	1	13	4
30 cauliflowers	0	7	6
14 stone potatoes, frying and preparings ...	0	5	0
14 roast chickens	2	9	0
Bread sauce	0	2	0
Potato straws	0	2	6
20 lettuces for salad	0	3	4
French dressing for do.	0	2	0
12 apple charlottes and sauce	0	12	0
8 ice puddings	0	16	0
Carry forward ...	10	3	5

	£	s.	d.
Brought forward ...	10	3	5
2 lb. Gorgonzola cheese	0	1	8
2 „ Cheddar „	0	1	8
2 „ butter	0	2	4
2 „ biscuits	0	1	0
36 bananas	0	3	0
36 tangerines	0	2	0
6 lb. apples	0	2	0
8 „ white grapes	0	8	0
4 „ black grapes	0	6	0
Rolls and bread	0	10	0
Flowers and plants	0	15	0
Cruets, salt, &c.	0	3	0
8 waiters	2	4	0
3 carvers	1	1	0
2 persons to wash up	0	5	0
Cartage	0	10	0
Cooking, &c.	2	2	0
	19	1	1

	£	s.	d.
Receipts:—100 persons at 6s.	30	0	0
Cost, without hire	19	1	1
Gross Profit	10	18	11

ESTIMATE FOR A BALL SUPPER, INCLUDING LIGHT REFRESHMENTS, FOR 100 PERSONS AT 6s. PER HEAD, WITH HOT SOUP ON DEPARTURE

Menu

Salmon mayonnaise. Cucumber salad.
Oyster patties. Veal and ham patties.
Roast boned turkey. Dressed ham. Roast chickens.
Dressed ox tongue. French salad.
Tomato salad. Golden jelly. Strawberry cream.
Vanilla cream. Maraschino jelly.
Trifle. Maids of honour.
Fours glacés. Ice pudding. Dessert.
Coffee.

Light Refreshments at Buffet Table

Claret cup. Still lemonade.
Orangeade. Soda and seltzer water.
Tea and coffee. Coffee biscuits.
Brown and white bread and butter.
Genoa, Madeira, and cherry cake.
Bonheur biscuits. Mascots.
Almonds and raisins. Meringue biscuits.
Lemon water ice. Ice wafers.
Strawberry cream ice. Parisian biscuits.
Vanilla cream ice.
Dessert, sweets, and chocolates.

Cost of Materials.

	£	s.	d.
24 lb. salmon	1	6	0
Cucumber salad	0	3	0
36 oyster patties	0	9	0
24 veal and ham patties	0	6	0
2 boned turkeys	2	0	0
2 ox tongues	0	10	0
1 dressed ham	0	12	0
20 roast chickens	3	0	0
Mixed salad...	0	5	0
Tomato salad	0	2	0
150 rolls	0	6	0
12 jellies	1	4	0
6 creams	0	18	0
6 trifles	1	4	0
36 maids of honour	0	3	0
36 fours glacés	0	4	6
10 ice puddings	1	10	0
Dessert	1	0	0
Coffee	0	10	0
Parsley and cress for garnishing ...	0	1	0
10 bot. claret	0	10	0
20 qt. orangeade	0	5	0
36 „ still lemonade	0	8	0
24 bot. soda	0	2	6
24 „ seltzer water	0	2	6
2 lb. tea	0	3	0
1½ „ coffee...	0	2	6
Bread and butter	0	2	0
Genoa cake	0	2	0
Madeira cake	0	2	0
Cherry cake...	0	2	0
Bonheur biscuits	0	2	0
Mascots	0	1	0
Almonds and raisins	0	2	0
Meringue biscuits	0	1	0
2 qt. lemon water ice	0	8	0
2 „ strawberry cream ice ...	0	10	0
2 „ vanilla cream ice	0	10	0
Ice wafers	0	1	6
Parisian biscuits	0	1	6
Dessert, sweets, and chocolates ...	0	5	0
6 waiters	1	10	0
4 attendants	1	0	0
Cartage	0	10	0
	22	17	0

	£	s.	d.
Receipts:—100 persons at 6s. ...	30	0	0
Cost, without hire	22	17	0
Gross Profit...	7	3	0

FIRST PRIZE SUPPER TABLE, BAKERY EXHIBITION. 1905

MODEL SUPPER BUFFET TABLE

SPECIMEN SUPPER TABLES

Estimate for Reception for 500 Guests at 3*s.* 6*d.* per Head

Menu

Sandwiches.
Ham. Ox tongue. Salmon cream.
Foie gras. Egg.
Cucumber. Potted beef. Cress.

Rissolettes of lobster. Chicken medallion.
Oyster patties. Veal and ham croquettes.
Maraschino jelly.
Strawberry cream. Meringues à la crème.
Fours glacés. Mascottes à la Reine.
Marrons glacés.
Genoese pastry. Parisian biscuits.
Cherry, Genoa, Madeira cake.
Strawberry cream ices. Cherry water ices.
Vanilla cream ices. Ice wafers.
Dessert.
Sweets and chocolates. Fruits, various.
Tea. Coffee. Lemonade.
Claret cup. Champagne cup.

Hire needed

60 ft. buffet table, according to measurement of room.
62 ft. baize to cover.
25 round tables and cloths.
22 yd. table cloths.
6 epergnes.
8 branch candelabra.
16 plated stands.
16 glass dishes for fruit.
4 soup tureens.
16 entrée dishes.
250 knives.
6 coolers for plants.
500 forks.
250 dessert spoons.
60 table spoons.
30 salt spoons.
30 mustard spoons.
4 soup ladles.
20 high glass dishes.
24 flat glass dishes.
30 salts.
30 mustards.
12 small cruets.
250 wine glasses.
250 champagne tumblers.
96 tumblers.
18 decanters.
18 water bottles.
18 glass jugs.
60 soda tumblers.
144 cups and saucers.
60 tea plates.
144 tea spoons.
4 plated urns.
8 milk jugs.
8 cream jugs.
8 sugar basins.
8 sugar tongs.
144 ice plates.
144 ice spoons.
70 meat dishes.
500 plates.
18 salvers.

Cost of Materials.

	£	s.	d.
40 doz. sandwiches, ham	6	0	0
20 „ „ beef	3	0	0
20 „ „ tongue, 5 dozen cucumber ...	3	15	0
20 „ „ salmon cream	3	0	0
10 „ „ foie gras, 10 doz. egg ...	3	0	0
120 rissoles of lobster	1	10	0
120 chicken medallion	1	10	0
120 oyster patties	1	10	0
120 veal-and-ham croquets	1	10	0
24 maraschino jellies	2	8	0
24 strawberry creams	3	12	0
24 dishes meringues and cream	2	8	0
4 lb. marrons glacés	0	9	0
3 „ mascottes à la Reine	0	4	6
8 „ cherry cake	0	6	0
8 „ Genoa cake	0	6	0
8 „ Madeira cake	0	6	0
10 qt. strawberry cream ice	1	10	0
10 „ cherry-water ice	1	5	0
Ice wafers	0	5	0
4 dishes dessert sweets	0	10	0
4 „ chocolates	0	10	0
Fruits, various	3	0	0
5 gal. tea	0	8	4
8 „ coffee	0	17	0
18 „ claret cup	3	12	0
10 „ champagne cup	2	5	0
20 waiters	5	10	0
2 head waiters	0	15	0
8 attendants	1	12	0
Plants and flowers	2	0	0
Cartage	1	0	0
Sundries	1	0	0
	60	13	10

	£	s.	d.
Receipts:—500 guests at 3*s.* 6*d.* ...	87	10	0
Cost, without hire ...	60	13	10
Gross Profit	26	16	2

Note.—Prices of goods vary according to season.

ESTIMATE FOR GARDEN PARTY FOR 200 PERSONS AT 3*s.* 6*d.* PER HEAD

Menu

Sandwiches.

Ham. Tongue. Cress.
Cucumber. Potted beef. Anchovies.
Salmon cream. Foie gras.

Gâteaux. Genoa cake. Madeira cake.
Mocha. St. Honoré.

Menu (*Continued*)

Strawberries and cream. Fruit jelly.
Vanilla cream. Petits fours.
Genoese pastry. Biscuits, assorted.
Chocolates. Bonbons, assorted.
Lemonade. Orangeade.
Claret cup.
Tea. Coffee. Iced coffee.
Strawberry ice cream. Vanilla ice cream.
Lemon water ice. Ice wafers.
Dessert.

Hire needed.

24 ft. buffet table, according to measurement of room.
24 ft. baize to cover.
10 round tables and cloths.
9 yd. table cloths.
4 epergnes.
16 plated stands.
8 coolers for plants.
24 glass dishes.
12 entrée dishes.
20 meat dishes.
500 plates.
100 knives.
144 dessert spoons.
48 table spoons.
24 salt spoons.
24 mustard spoons.
16 high glass dishes.
16 salts.
16 mustards.
8 small cruets.
144 wine glasses.
144 champagne tumblers.
60 tumblers.
36 soda tumblers.
12 decanters.
12 water bottles.
12 glass jugs.
84 cups and saucers.
36 tea plates.
84 tea spoons.
2 urns.
4 milk jugs.
4 cream jugs.
4 sugar basins.
4 sugar tongs.
100 ice plates.
100 ice spoons.
6 salvers.

Cost of Materials.

	£	s.	d.
50 doz. sandwiches, various ...	7	10	0
3 Mocha gâteaux	0	4	6
3 St. Honoré gâteaux	0	4	6
8 lb. Genoa cake	0	6	0
6 „ Madeira cake	0	4	6
6 strawberry creams	0	18	0
12 fruit jellies	1	4	0
6 vanilla creams	0	18	0
Genoese pastry	0	5	0
Petits fours	0	5	0
4 lb. biscuits, various	0	3	4
4 dishes chocolate, bonbons, assorted	0	10	0
30 qt. claret cup	1	10	0
36 „ lemonade	0	9	0
15 „ orangeade	0	3	9
8 „ tea	0	2	0
16 „ coffee	0	6	8
8 „ strawberry ice cream ...	1	12	0
4 „ lemon water ice	0	12	0
Ice wafers	0	2	0
Carry forward ...	17	10	3

	£	s.	d.
Brought forward ...	17	10	3
Dessert	1	10	0
Plants and flowers	1	0	0
10 waiters	2	15	0
2 head waiters	0	15	0
2 attendants	0	7	0
Cartage	0	10	0
8 qt. milk	0	2	0
8 lb. sugar	0	1	6
	24	10	9

	£	s.	d.
Receipts:—200 guests at 3*s.* 6*d.* ...	35	0	0
Cost, without hire ...	24	10	9
Gross Profit	10	9	3

Estimate for Ball Supper for 200 Persons at 5*s.* per Head

Menu

Mayonnaise of salmon.
Dressed ham. Boned turkey.
Dressed tongue.
Pressed beef. Galantine of chicken.
Roast fowls.
Veal and ham pies.
French salad. Tomato salad.

Golden jellies.
Strawberry cream. Maraschino jellies.
Charlotte russe. Meringues.
Fancy pastries.
Fours glacés. Trifles. Ice pudding.
Wafers.

Soup on departure.

Light refreshments during the evening.
Genoa cake. Madeira cake.
Genoese cake.
Coffee biscuits. Parisian biscuits.
Wine biscuits. Small macaroon biscuits.
Still Lemonade. Orangeade.
Claret cup.
Coffee. Neapolitan ices.
Dessert.
Sweets and chocolates.

Hire needed.

150 ft. tabling and trestles.
154 „ baize.
54 yd. table cloths.
200 chairs.
200 napkins.
4 centre pieces.
24 fruit stands.
12 dessert stands.
10 candelabra.
400 large knives.
200 small knives.
24 pair carvers and forks.
200 large forks.
200 small forks.
200 dessert spoons.
80 table spoons.
200 fish knives and forks.
8 salts.
8 mustards.
4 soup ladles.
400 plates.
72 dishes, assorted.
4 soup tureens.
200 soup cups.
24 high glass dishes.
24 flat dishes or entrées.
48 glass salts.
48 mustards.
200 wine glasses.
200 claret glasses.
200 champagne glasses.
72 tumblers.
96 ice plates.
96 ice spoons.
200 lemonade tumblers.
96 cups and saucers.
96 tea spoons.
2 urns.
4 cream jugs.
4 sugar basins.
4 sugar tongs.
6 salvers.
200 small plates.

Cost of Materials.

	£	s.	d.
40 lb. mayonnaise of salmon	3	0	0
2 dressed hams	1	0	0
2 boned turkeys	2	0	0
3 braised ox tongues	0	15	0
8 lb. braised beef	0	10	0
2 galantines of chicken	0	8	0
3 veal-and-ham pies	0	15	0
30 roast chickens	4	10	0
16 French salads	0	8	0
10 tomato salads	0	5	0
6 golden jellies	0	18	0
6 maraschino jellies	0	18	0
2 charlotte russes	0	10	0
4 strawberry creams	0	12	0
12 dishes meringues, with cream ...	0	12	0
36 „ French pastries	0	3	0
36 „ fours glacés	0	3	0
5 „ trifles	1	5	0
20 pt. ice puddings	2	0	0
Ice wafers	0	3	0
220 supper rolls	0	9	2
Flowers and plants	1	0	0
16 qt. soup	0	12	0
Sundries	0	10	0
16 waiters	4	8	0
2 head waiters	0	15	0
4 attendants	1	0	0
Cartage	0	10	0
Light refreshments—			
4 lb. assorted cake	0	3	0
4 „ „ biscuits	0	3	4
36 qt. lemonade	0	9	0
15 „ orangeade	0	3	9
36 „ claret cup	1	16	0
3 gal. coffee	0	5	0
Carry forward ...	32	19	3

	£	s.	d.
Brought forward ...	32	19	3
300 Neapolitan ices	1	5	0
4 dishes dessert, sweets, and chocolates	0	10	0
8 qt. milk	0	2	0
8 lb. sugar	0	1	6
	34	17	9

	£	s.	d.
Receipts:—200 guests at 5s. ...	50	0	0
Cost, without hire ...	34	17	9
Gross Profit	15	2	3

Estimate for Wedding Breakfast for 50 Persons at 7s. 6d. per Head

Including Hire of Tables, Seats, Table Linen, Plate, Glass, China, Cutlery, Plants, Cartage, and Attendance.

Menu

Consommé à la royale.
Salmon mayonnaise. Cucumber.
Roast boned turkey.
Braised York ham. Braised ox tongue.
Raised pigeon pies.
Roast chickens.
Aspics of foie gras. Aspics of prawns.
Galantine of veal.
Braised beef. Lobster salad.

Maraschino jellies. Strawberry creams.
Meringues with cream.
Charlotte russe. Sherry jellies.
Fours glacés.
Mascottes à la Reine. Maids of honour.
Swiss pastries.
Strawberry cream ice. Lemon water ice.
Ice wafers.
Dessert. Coffee.

Hire needed.

38 ft. tables, trestles, and baize.
50 chairs.
14½ yd. table cloths.
50 napkins.
1 bride-cake stand.
1 cake saw.
2 epergnes.
8 fruit and flower stands.
125 large knives.
50 small knives.
6 pairs carvers.
Large knives and steel forks.
50 large forks.
50 small forks.
50 dessert spoons.
20 table spoons.
50 ice spoons.
50 soup spoons.
2 soup ladles.
12 salt spoons.
6 mustard spoons.
32 dishes, assorted.
150 plates.
50 soup plates.
2 soup tureens.
10 high glass dishes.
10 entrée dishes.
50 wine glasses.
50 champagne glasses.
50 hock glasses.
25 tumblers.
6 decanters.
4 claret decanters.
4 glass jugs.
4 water bottles.
12 salts.
6 mustards.
50 ice plates.
10 flat glass dishes.
18 hâtelette skewers.
2 salvers.

Cost of Materials.

	£	s.	d.
12 qt. soup	0	12	0
12 lb. salmon	0	18	0
2 pt. mayonnaise	0	4	0
2 cucumbers	0	0	8
1 roast boned turkey	1	0	0
1 braised ham	0	10	0
2 „ ox tongues	0	10	0
1 raised pigeon pie	0	5	0
6 roast chickens	0	18	0
3 aspics of foie gras	0	10	0
3 aspics of prawns	0	6	0
2 galantines of veal	0	10	0
8 lb. braised beef	0	8	8
3 lobster salads...	0	12	0
4 maraschino jellies	0	12	0
4 strawberry creams	0	6	0
3 dishes meringues, with cream ...	0	6	0
2 charlotte russes	0	8	0
2 sherry jellies...	0	6	0
36 fours glacés	0	3	0
1½ lb. mascottes à la Reine	0	2	3
24 maids of honour	0	2	0
24 Swiss pastries	0	2	0
4 qt. strawberry ice cream	0	12	0
2 „ lemon water ice	0	6	0
1 lb. ice wafers	0	2	0
Dessert, assorted	0	14	0
50 coffees (best coffee)	0	4	2
Sundries, cruets, milk, and sugar ...	0	4	0
3 waiters	0	16	6
1 head waiter	0	7	6
2 attendants or porters	0	5	0
Cartage	0	10	0
Rolls	0	3	0
Flowers and plants	0	5	0
	14	0	0

	£	s.	d.
Receipts:—50 guests at 7*s.* 6*d.* ...	18	15	0
Cost, without hire ...	14	0	0
Gross Profit	4	15	0

Note.—The prices vary according to season.

CHAPTER XLV

SAMPLE MENUS

Dinner Price Factors.

The prices obtained for dinners and other functions for which the confectioner-caterer estimates do not depend wholly or even principally on the cost of the viands supplied. The number to be catered for, the amount of service desired, the distance at which the function is to be held, and the proportion of the cost to be expended in decoration, are all important factors in determining the cost to the caterer, and therefore the price at which they can be profitably undertaken. Estimates have already been given showing in detail what proportion these items usually bear to the total cost of entertainment, and these figures will serve as a general guide; but customers have often fancies in one direction and another, and to carry these out generally increases the expenses. The following menus for dinners, ball suppers, wedding breakfasts, &c., are compiled from recipes and instructions given in previous parts of this work. They can be varied and multiplied to almost infinite extent from the same sources, but those here set out will serve as examples which may be followed with confidence, and may suffice to guide those who have not yet undertaken outside catering work very extensively. The prices for dinners only are given, the numbers assumed being not less than 100 in each case. Alternative menus are given for each price.

Special Menus from Recipes.

DINNER FOR 100 AT 5*s.* PER HEAD. (*Wines Extra*)

Menu No. 1

Consommé à la Printanière. Purée de Pois Verts.
Turbot Bouillé. Pommes Nouvelles.
Ris d'Agneau à la Milanaise.
Poulet Rôti. Salade.
Gelée au Rhum. Glace à la Fraise. Dessert.

Menu No. 2

Consommé à la Princesse. Purée à la Palestine.
Cabillaud à la Hollandaise. Pommes Nouvelles.
Filets de Volailles à la Boulangère.
Bœuf Rôti. Épinards. Chartreuse d'Abricot.
Glace au Citron. Dessert.

Menu No. 3

Potage à la Hesse. Purée à la Bretonne.
Cabillaud à la Hollandaise. Pommes Nouvelles.
Poulet Sauté à la Marengo. Filets de Bœuf.
Legumes. Glace Citron. Dessert.

Menu No. 4

Consommé Bourgeois.
Turbot au Gratin à l'Italienne.
Noisettes d'Agneau aux Pointes d'Asperges.
Pommes Nouvelles. Poulet en Casserole. Salade.
Glace Plombière. Fromage. Dessert.

DINNER FOR 100 AT 7*s.* 6*d.* PER HEAD

Menu No. 1

Consommé Julienne. Saumon Bouillé. Sauce Vert.
Agneau Rôti. Sauce Menthe.
Pommes de Terre Nouvelles. Épinards. Canard Rôti.
Sauce aux Pommes. Salade. Charlotte à la Vanille.
Salade de Fruits. Glace aux Fraises.
Dessert. Café.

Menu No. 2

Consommé aux Queues de Bœuf. Potage à la Bonne Femme.
Filets de Soles Frits.
Escalopes de Ris de Veau à l'Archiduchesse.
Filets de Volaille à la Bigarure.
Poulet Sauté à la Marengo. Salade. Macédoine de Fruits.
Glace Fraise. Fromage. Dessert.

Menu No. 3

Purée à la Palestine. Saumon.
Sauce Homard. Pommes Nouvelles.
Croustades de Ris de Veau aux Petits Pois. Selle de Mouton.
Chou-fleur au Gratin. Tomates à la Provençale.
Gelées Variées. Pâtisserie.
Glace Vanille. Fromage. Dessert.

DINNER FOR 100 AT 9*s.* PER HEAD

Menu No. 1

POTAGE—Consommé Julienne.
POISSON—Barbue Bouillie. Sauce aux Crevettes.
ENTRÉE—Côtelettes d'Agneau à la Maintenon.
RELEVÉ—Civet de Lièvre à l'Anglaise.
Pommes de Terre. Choux de Bruxelles.
ROT—Poulet Rôti.
SALADE. ENTREMETS—Petits Poudings à la Victoria.
Bombe d'Abricot. Dessert. Café.

Menu No. 2

Potage de Queue de Bœuf. Éperlans Frits.
Filets de Turbot au Gratin.
Salmis de Gibier. Filet de Bœuf Braisé à l'Américaine.
Pommes de Terre. Purée d'Épinards.
Poulet Rôti. Salade. Soufflé à la Vanille.
Gelée au Citron. Fromage.
Dessert. Café.

DINNER FOR 100 AT 12*s.* 6*d.* PER HEAD

Menu No. 1

Hors-d'œuvre. Huîtres. Potage de Tortue Clair.
Purée de Pois Verts. Turbot. Sauce Mousseline.
Blanchailles. Ris de Veau à la d'Uxelles.
Quenelles de Volaille. Selle de Mouton.
Punch à la Romaine. Perdreaux Rôtis. Pouding à la Reine.
Bombe d'Abricot. Croûtes à la Burlington.
Dessert. Café.

Menu No. 2

Huîtres. Consommé à la Julienne. Purée de Tomates.
Blanchailles. Turbot. Sauce Mousseline.
Cailles Farcis. Selle de Mouton.
Pommes de Terre. Choux de Bruxelles. Sorbet Maraschino.
Faisan Rôti. Salade. Chartreuse d'Ananas.
Glace au Pistache. Dessert. Café.

DINNER FOR 100 AT 15*s.* PER HEAD

Menu No. 1

Hors-d'œuvres. Lax sur Croûtes. Consommé à la Brunoise.
Purée de Tomates. Saumon.
Sauce Allemande et Concombres. Blanchailles.
Ris de Veau à la Melita.
Zephyrs de Caneton à la Belle Ile.
Sorbet Fine Champagne. Cailles Farcies en Casserole. Salade.
Céleri à la Crème. Croûtes aux Ananas. Bomb Dahomey.
Petits Fours. Dessert.

Menu No. 2

Hors-d'œuvres. Huîtres au Naturel.
Consommé à la Julienne. Purée d'Asperges.
Turbot Bouillé. Sauce d'Homard. Mayonnaise de Saumon.
Ris de Veau à la d'Uxelles.
Compote de Pigeons à la Zingara.
Sorbet d'Orange. Cailles en Salmis aux Tomates Farcies.
Savarin au Peach. Comtesse Marie.
Petits Fours. Dessert.

Dinner for 100 at 17*s.* 6*d.* per Head

Menu

Huîtres au Naturel. Tortue Claire. Filets de Sole à la Richelieu.
Rougets aux Fines Herbes. Steak à la Chateaubriand.
Filets de Pintade à la Lorraine.
Chou-fleur au Gratin.
Pommes de Terre à la Maître d'Hôtel.
Ris de Veau aux Épinards. Sorbet au Champagne.
Faisan en Casserole. Salade.
Macédoine aux Fruits. Glace Framboise.
Croûtes à la Burlington.
Dessert. Café.

Ball Suppers and Receptions

Menu No. 1

Chaud.

Consommé de Volaille en Tasse. Côtes de Mouton aux Haricots Verts.
Compote de Cailles aux Olives Farcies.

Froid.

Filet de Volaille en Belle Vue. Mousse de Foie Gras.
Jambon de York à la Gelée. Pâté de Faisan.
Galantine de Volaille. Pâté de Périgord. Salade à la Russe.
Macédoine de Fruits au Liqueur. Gelées Variées.
Meringues à la Crème. Dessert.

Menu No. 2

Froid.

Filets de Saumon Mayonnaise. Poulets Rôtis. Chapon Farci.
Jambon. Langue de Bœuf.
Chaudfroid de Cailles. Parfait de Foie Gras.
Côtelettes d'Agneau à la Victoria. Bœuf Rôti. Salades de Homard.
Gelée Macédoine. Gelée au Noyau. Chartreuse d'Abricots.
Gâteau à la Grecque. Pouding à la Vénetienne.
Petites Meringues. Pâtisserie. Pouding Glacé à la Nesselrode.

Menu No. 3

Tranches de Truites. Mayonnaise de Saumon.
Filets de Ris de Veau à la Gelée. Ballotines de Volailles.
Filets de Volailles en Belle Vue.
Filets de Pintade à la Lorraine. Côtelettes d'Agneau en Aspic.
Sandwiches—Jambon. Langue. Foie Gras. Anchois.
Volaille. Saumon Fumé. Œufs et Cresson.
Gelées Variées. Crèmes Assorties.
Chartreuse de Tangerines. Chartreuse d'Abricots. Meringues à la Crème.
Gâteau Fédora. Biscuits Assortis. Marron Glacé.
Petits Fours. Chocolat. Fondants.
Glaces. Crème aux Fraises. Crème à la Vanille.
Eau de Citron. Limonade. Dessert.

Menu No. 4

Filets de Soles en Belle-Vue. Mayonnaise de Saumon.
Salade d'Homard. Côtelettes d'Agneau en Aspic.
Galantine de Volaille. Poulets Rôtis au Cresson. Langue de Bœuf.
Dinde Farcie Braisée. Pâté à la Périgord.
Gelées au Vin et Fruits. Crèmes Variées.
Meringues à la Crème. Petit Chou.
Macédoine de Fruits. Dessert.

Menu No. 5

Mayonnaise de Homard. Pâté de Pigeon. Pâté de Gibier.
Galantine de Veau. Poulets Rôtis. Poulets à la Béchamel.
Jambon de York. Langues de Bœuf.
Dindon aux Truffes. Bœuf Rôti.
Salade à la Française. Crèmes aux Fraises.
Crèmes à l'Orange. Fanchonettes. Bonne Bouchée.
Meringues à la Crème. Dessert.

CHAPTER XLVI

THE RESTAURANT KITCHEN

Restaurant v. Dining-Room.

The restaurant, of which the name has been adopted from the French, has practically superseded the old-fashioned dining-rooms of the Georgian and early Victorian era. Our French friends have certainly introduced more variety on the menu with the new title, and their "soups and stews and choice ragouts" have (at any rate a good many of them) caused a considerable number of the old-time dishes to become obsolete as far as the everyday menu is concerned. The roast beef of old England still flourishes, however, almost daily, as do also the grilled chop and steak, and these old standards are likely to hold their ground in the restaurant menu of Great Britain for very many years to come; indeed, it is a risky business to leave them out even for a single day. The writer has been told by more than one traveller who has "done" some of the very best hotels and restaurants on the Continent that he has always been glad to get back to the steaming hot cut from the joint, and the grilled chop or steak. The word Restaurant, however, is very far-reaching—as elastic, in fact, as the word Hotel. It may denote anything between the palatial establishments patronized by the *crème de la crème* of society and those humbler havens for the hungry where you may obtain sausage and mash for 4*d*.

This article is intended for neither of these, however, but for the higher middle-class restaurant, that may or may not have another business attached to it, such as a general catering establishment or confectioner's

HIGH CLASS RESTAURANT

shop, one where the daily patronage may be anything between fifty and one hundred and fifty per day. The proprietors of these establishments are most likely to become the readers of this work, and to them it will be almost superfluous to lay down the advice always to make it a point to have the bread and confectionery and kitchen work done in separate departments, even if there is nothing but a stone or table to separate them; but a wall would be better still. A responsible man called the foreman usually superintends the former, whilst the chef takes charge of the latter.

Keep Departments Separate.

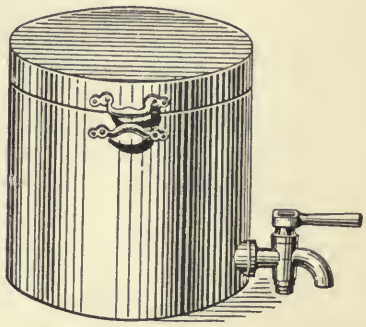


Fig. 154.—Stockpot

Supposing, then, that a business of this kind is about to be established in some good provincial town, and the cooking arrangements, such as hot plate, gas stove, and other fixtures, are complete and ready for working, the next important consideration will be the necessary utensils with which to furnish the kitchen. It will be a really wonderful list that will embrace everything required in a new venture of this kind, because so much has to be discovered after the business has started, but we will endeavour to enumerate the most important items—those which are practically indispensable, in fact, for the class of business indicated above. First and foremost on the list should be two stockpots (fig. 154), each holding about 12 to 16 gal., with a tap and drainer in each for the purpose of draining off stock, &c. These may be made of copper or block tin (tinned iron); if of copper, they are, of course, expensive, but will last a lifetime, though they require retinning occasionally. A sure indication of this necessity is when your stock has a tendency to turn smoky-black in colour. The block-tin pots might last with great care from five to ten years, but they have a bad habit of leaking when least expected. They will stand new bottoms once or twice in that time, but they have to be cut down two or three inches by the tinman each time this operation is performed, so that their capacity becomes less. Otherwise they are good pots where initial economy is the consideration. The necessity for having two stockpots will be obvious, for although it may be very seldom that they are required on the stove at one time, that necessity may arise any day, or the one in use may spring a leak, and the business won't wait till the tinman has effected the repairs.

The Stockpot.

Fig. 155.—Stewpan

Next in importance on our list of utensils should be six or eight copper stewpans (fig. 155) of a capacity of 4 to 12 qt., with say six auxiliaries in black saucepans for emergencies—the boiling of

Stewpans.

vegetables, &c. A bain-marie case is another important item. This is really a shallow pan (see fig. 156), usually about 18 in. square and about 6 in. deep. It is about half-filled with hot water, so that sauces and entrées, which are already in pans, may be kept hot without burning. The frying kettle is another important asset in the kitchen. This is oval, with a wire drainer usually made of steel and welded together, as hot fat will melt anything in the way of soldered joints. Six ordinary frying pans will be required,

Bain-Marie.

Frying Kettle.

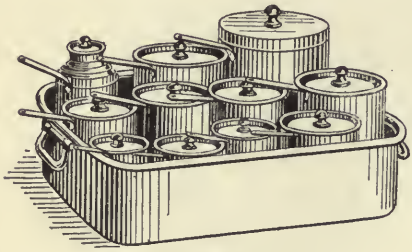


Fig. 156.—Bain-Marie Pan

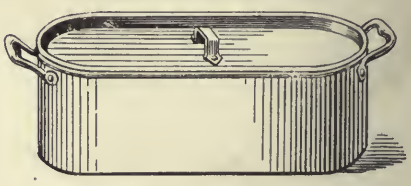


Fig. 157.—Fish Pan

including four large oval and two small round, the latter for omelets, pancakes, &c., and the former for bacon, ham, and other fried meats. We also require two hair sieves (fig. 158), one rather coarse, the other fine, and two wire (brass) sieves, one coarse and one fine. These should be about 14 in. in diameter. The hair sieves are required for straining stock, soup, &c., whilst the wire sieves are required for making bread crumbs (brown and white), and for other purposes too numerous to mention.

Frying Pans.

Sieves.

Large and Small Coolers.

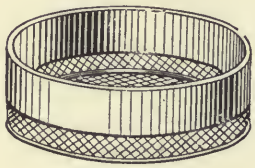


Fig. 158.—Sieve

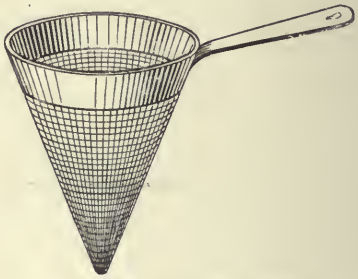


Fig. 159.—Pointed Strainer

Six or eight large block-tin or enamelled coolers are required for the reception of stock, &c., and about the same number of smaller ones, the latter for remnants left from the day's entrées and the like. Two or three pointed strainers (fig. 159) are also indispensable. These may be medium and fine, as they are required for straining gravies, sauces, &c., and are in almost constant demand.

Pointed Strainers.

In addition to the larger pots already enumerated, a turbot kettle (fig. 160) will be necessary. This, as its name implies, is practically built for the turbot, and is of that shape, but, of course, it will cook other fish just as well, and is especially handy in a

Fish Kettles.

restaurant, as several portions of any sort of boiled fish may be kept hot in it for quick serving. There is a very useful pot on the market which is made of cast iron, this being its weakest point, for it will not stand knocking about without cracking, in which case the tinman cannot mend it. It will last a great many years with careful handling, and is most useful for a great variety of purposes, such as the boiling of a large quantity of vegetables, hams, tongues, special

Cast-iron Boiling Pots.

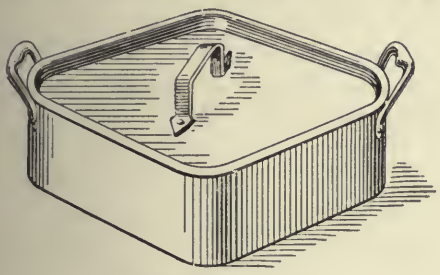


Fig. 160.—Turbot Pan

Fig. 161.—Oval Cast-iron Pot

beef, &c. There is another pot equally useful, without the disadvantage of being breakable, which is made of tinned iron or block tin. It is more of an oblong pattern, and when big enough will boil a round of beef or boar's head, with enough surrounding liquid to obviate the necessity of replenishing with hot water. It is somewhat after the fashion shown in fig. 162, and probably holds about 10 gal. If the local ironmonger does not stock them so large as this, the tinsmith can readily make one to order.

Block-tin Boiling Pots.

We now come to the smaller utensils, such as the ladles and spoons. At least four each of these will be required, with four fish slices. They may be in copper or iron and of various sizes. In addition to these we need

Small Utensils.

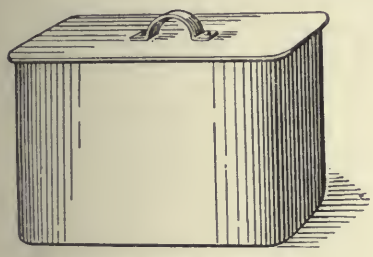


Fig. 162.—Block-tin Boiling Pot

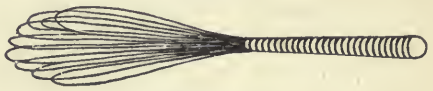


Fig. 163.—Whisk

six wooden spoons, a wire frying basket, and a couple of whisks. The old-pattern whisk with a wooden handle is of little use for rough wear, the wood and the wire having a tendency to dissolve partnership with heavy work. Therefore, the best one for our purpose of the ready-made type is that with a wire handle, as it will last out three or four of the old-fashioned type (fig. 163). It is always well to have a good supply of enamelled-iron dishes, for the more you have of these the fewer breakages there will be among the breakable ones.

Enamelled-iron Dishes.

Two important items still to be mentioned are the mortar and the

mincing machine. It is as well to have two kinds of mincing machines. There is a cheap American machine that is admirable for mincing cooked meat, apples, and the like, but which is useless for raw meat, and there is another of British manufacture which is good for raw meat. It is true that you can pound meat in the mortar, but the machine work is much more effective and expeditious.

Mincing Machines.

The mortar is practically indispensable in any kitchen where economy has to be studied, but it is necessary to have one at least 12 in. in diameter, inside measurement. This should be fixed on a solid foundation, and have the regulation lignum-vitæ pestle, the handle of which works through a ring overhead. When once fixed this arrangement will

Mortar.

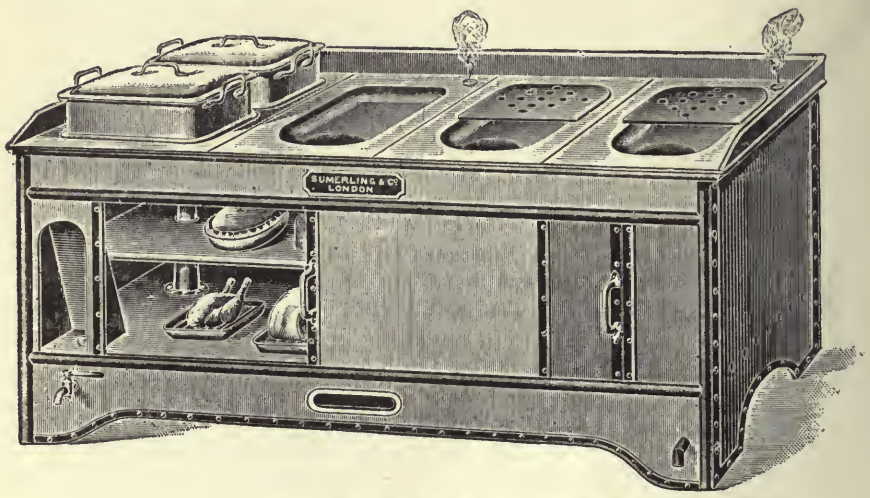


Fig. 164.—Carving Table and Hot Cupboard

speedily pay for itself, as it will very quickly convert dried scraps of bread and toast into serviceable bread crumbs for fish-crumbing purposes, and will crush up a bar of salt in an amazingly short space of time, besides being useful for other crushing and mixing purposes too numerous to mention.

In the majority of the larger restaurants the grilling and the joint-carving are done almost in the presence of the diner, that is, in the dining-room itself, in which case one of the staff is told off from the kitchen to perform these functions for a couple of hours or so each day. Where this is not the rule a "half-day man" (a waiter and carver combined) is usually employed, and in some instances the proprietor himself presides over the hot joints. These methods, however, depend on the amount of trade and the amount of space in the dining-room, and may be entirely superseded by this work being done in the kitchen, especially if the cooking and the dining are not too far apart, as cold draughts and a long journey will speedily convert a hot plate of meat into a lukewarm one, and a few incidents of this kind will soon damage the reputation of any restaurant.

Carving in Dining-Room.

The well-known firms who are in the habit of fitting up kitchens have several excellent plans for fixing up the necessary plant for keeping joints hot. Those heated with boiling water are very effective and economical. The water is heated by gas as a rule, and this of course may be turned on or off at the will of the operator, and one of these fixtures may easily be capable of keeping a variety of three joints hot with necessary gravies, sauces, and vegetables, so that the carver—if not overwhelmed with business—may take command of the whole lot, although the vegetable maid usually presides over her department in this respect.

Hot Tables.

Duties of Carver.

The "sweets" course of the average restaurant menu is not as a rule very extensive in variety; at least something easily served bearing a good old-time reputation seems to suit the patrons of these establishments far better than the more elaborate entremets from the Continent. So to keep pace with these demands, enamelled-iron pie dishes and plain pudding moulds will be absolutely essential among the rest of the necessary utensils. Such articles as jellies, creams, and blancmanges are very seldom patronized for this class of trade, although stewed fruits of various kinds with custard have a good following. Should the restaurant be "run" in conjunction with a confectioner's shop, the mince pies, cheesecakes, and other pastry goods would be supplied from that department, also the patty cases and the rolls—in fact, anything that may be on the everyday list of the bakehouse proper.

Sweets in Restaurant Menu.

Pastries as Sweets.

Having disposed of what we may term the main features of the restaurant kitchen of the class indicated in the early part of this chapter, let us take a view of the necessary staff to work it. Assuming that the restaurant business is likely to embrace between a hundred and one hundred and fifty patrons as a daily average, with an occasional ball supper or other outdoor function in addition, it would be necessary to employ a chef to take over the control of the kitchen, and with him a young fellow to act as second, a good reliable kitchen maid, and either a good general female help or a vegetable maid, and a strong young fellow to act as kitchen porter. If all the plates and dishes are washed in this department a good scullery maid would be necessary. She would take a large share of the scrubbing, and assist in the preparation of vegetables, such as peeling potatoes, washing cabbage, &c. It may be remarked here that although this last-mentioned servant is placed practically on the lowest rung of the restaurant ladder, her importance is very great, and a really good scullery maid is invaluable. To her we look for the clean plate from which we take our food, to her we look to a very great degree for the cleanliness of the place from which we get that food, and provided she is naturally industrious and intelligent, her possibilities are extensive. She may by observation acquire sufficient knowledge to become vegetable maid, her next promotion would be to kitchen maid, then to chef's assistant,

Staff for Restaurant.

Scullery Maid.

and afterwards she could take charge of a kitchen as woman cook. This is no imaginary picture, for the writer has several first-class female cooks in his mind at the present time who commenced in the way described. There is a great demand for first-class female cooks to-day, but the supply is not equal to the demand, as the training is not sufficiently "genteel" for the average middle-class daughter. She wants her freedom, the print dress and white apron are wormwood to her, and in the event of her not having a home to go to, she would prefer dispensing with a banking account altogether and barely live from hand to mouth in lodgings in order to keep up appearances behind a shop counter, or as a female clerk.

But to resume the consideration of the staff of a restaurant kitchen. We will assume that the place is about to start business, and the staff enumerated above are engaged. It would of course be expedient for the manager or manageress to have consultations with the chef in advance as to the class of business and compilation of suitable menus, according to the class of customers likely to patronize the establishment. The experienced chef will naturally know the various duties of all his subordinates, and will act accordingly, but however experienced he might be, he will doubtless find that a new business will not go very smoothly for the first few days. The machinery will be somewhat stiff at the starting, and the amount of trade will be a matter of speculation. It is wasteful to be much overstocked with supplies, and it is bad form to run short, so that the first few days of any business are a trying time. Let us now give a rough outline of the average duties of a kitchen staff of the above type.

Relation of Manager and Chef.

Difficulties of Starting.

The chef's duties may be summarized thus: to take general control, to write menus, to keep the store book, to write orders, to check incoming stores, to direct the kitchen staff and see that their duties are performed, to finish soups, entrées, &c., which are beyond the abilities of the second cook, to give orders, and superintend the general serving out of all dishes for the dining-room. If the chef is a good disciplinarian, without being altogether a martinet, it will be all the better for himself, his staff, and the business.

Duties of Chef.

The duties of the second cook (in some establishments they have what is termed an improver at this post) would be to carry out the instructions of the chef, to be his right-hand man in fact, and to represent him during his absence. He would probably—with the aid of the kitchen porter—be responsible for the plain roasting of joints, poultry, &c.; see to the supply of good stock and foundations for soups, sauces, &c.; cut chops and steaks, and, in the absence of a regular carver, assist with the carving and the grills. In fact, he invariably possesses the ambition to become a chef, and the more painstaking and industrious he is the sooner he will reach that goal. Two most valuable qualities in his composition would be willingness and respect

Second Cook's Duties.

HIGH CLASS CONFECTIONER'S TEA ROOM

for his instructor, and if he has natural ability as well his ultimate success is assured.

The next servant in importance is the kitchen maid. Her duties are various, but important. It generally falls to her to make all sorts of stuffing, apple and other plain sauces, and bread crumbs (white and brown); also to crumb fish for frying, to look after the chef's meals, in the absence of a vegetable maid to boil the vegetables and fry the potato chips, and in conjunction with the scullery maid to keep the kitchen dressers clean. The kitchen maid's post is no sinecure as far as duties are concerned, but then she is rising in the profession, and it is she who will be the woman cook mentioned earlier in this chapter. The typical kitchen maid is a picture: clean print dress, snow-white apron, white cap, bare arms, compact figure, and quick movement. She may be looked upon with disdain by the average shop girl, but she is not a whit inferior in her financial worth or in the importance of her post; indeed, the possibility of a banking account is far greater in her case than in that of her more stylish sister.

Duties of Kitchen Maid.

The next assistant in importance on the kitchen staff is the vegetable cook (if one is kept), and if she is capable of taking over this department entirely, using judgment at all times, and serving up the vegetables with unvarying success, she will be invaluable. As her title implies, her all-important duties will be in connection with the management of the vegetable department, and in a good many ways assisting the second cook or the chef in the preparation thereof for soups, sauces, &c. Her opportunities are great, therefore, for picking up a good knowledge of cooking, and in this way she will learn more by observation and practice than she would by a constant perusal of all the cookery books on the market, or by watching a demonstrator at the technical institute.

Duties of Vegetable Cook.

The kitchen porter, as his name implies, should do the heavy work of the department. His duties generally consist of scouring stockpots and stewpans, the cleaning of the kitchen floor and of all the brass and steel work, lighting fires, and carrying coals, besides giving assistance to the second cook in roasting joints, &c. It is a common thing in America for a kitchen porter to rise from his position to that of chef in the same establishment, and there is no reason why he should not, if he possesses the necessary ability. Very frequently in Britain kitchen porters get engaged as roast cooks at the large hotels.

Duties of Kitchen Porter.

The last, but by no means least, on our present list is the scullery maid. Humble as is her position, it is an important one, and her one and only motto is work. Besides her regular duties of peeling potatoes, washing plates and dishes, she is practically ready for all emergencies. If an entrée or a tureen of sauce is accidentally upset in the dining-room, it is the scullery maid who is invariably called upon to bring her bucket and floorcloth to clean it up; in

Duties of Scullery Maid.

short, she is a kind of reserve force in the establishment, and if her temper is not always exactly as it should be, she has a good deal to ruffle it at times. If she is shrewd, however, she will bide her time and watch her opportunities.

Supplies.

In regard to supplies it would be difficult to lay down a hard-and-fast rule, but the prevailing custom in restaurants is for the chef and the manager to spend half an hour together after the luncheons are over, to discuss the following day's menu, and for this, as a rule, some fresh supplies are required. The chef would naturally make notes of what he has left from that day's menu, and make up that for the following day accordingly, so as to use up as much as possible in a presentable form to the customers. Where a variety of two or three joints are kept hot daily, in addition perhaps to a couple of kinds of poultry, there is sure to be a greater run on some than on the others; consequently there will be something to spare, which should be turned into money the following day. The great point, however, in the ordering of fish, joints, and poultry from the market, is to get the best quality. The British public will follow quality, and, as a rule, are willing to pay a little more for it. Customers will come again, and perhaps bring one or two friends next time, but if inferior meat is served, they will perhaps be lost to the establishment after the first trial, especially if there is much opposition in the town. The finest chef in existence cannot manipulate a joint of inferior beef to equal that cut from a prime English beast, so that the good-quality stuff carries its own advertisement, whether it be sold as hot joint, entrée, or what not.

Making up Left Viands.

The Cold-meat Table.

As it is the custom to have a cold-meat display in the restaurant, especially in the summertime, there is no harm in having a joint of beef, or even lamb, left from the business, as these make up for cold, with the addition of salad; but there is little use for cold pork or mutton on this table, therefore these should not be overstocked. Poultry, on the other hand, can always be worked up for the following day's menu, and when uncut may accompany cold ham and tongue for the cold meat table. It is in connection with this department that outdoor catering may come in with advantage, for if a ball supper is catered for, say the previous night, there is invariably more provided than is actually required, for it is bad policy to cut the supply too fine. Therefore, what is left, such as game pie, galantine of turkey, and the like, all helps to increase the display on the cold-meat table at the restaurant or in the public window; in fact, it is a common occurrence for a customer to buy one of these savoury dishes right out for some little party he may have at his private residence.

Permanent Dishes.

Whatever changes may be made on the daily menu in regard to poultry, entrées, and the minor joints, it will be found advantageous to keep roast beef, and grilled chops and steaks, on the permanent list. Although the beef, of course, may be cut and served immediately, the customer is always willing to wait from seven

to ten minutes for his chop and steak, as unless it comes to him direct from the grill he will not get it to perfection. This, as the reader is doubtless aware, is a recognized condition in any restaurant, for a ready-cooked chop or steak which has been standing some time is not to be compared to one fresh from the grill.

The general extent of the meat supply should, to a very great extent, be left to the discretion of the experienced chef, although it is absolutely essential that he should work hand in hand, so to speak, with the manager and the head waiter. It is the last-named who is actually in touch with the customers, and slight errors may come under his observation which he can handle with tact so as to prevent friction. An even-tempered and tactful head waiter is a most valuable asset in any restaurant, hotel, or club.

Chef, Manager, and Head Waiter.

We have now given some idea as to the most economical joints to prepare daily, but naturally enough there will always be something left, however carefully the list of supplies is made out. Cold lamb which is too far cut into to be presentable on the cold-meat table may be minced and served with poached eggs as an entrée the following day. The remains of veal may be served in the same way, in which case a little rolled bacon may be added to the dish. It may also be converted into croquettes, rissoles, kromeskys, bouchées, or patties, and figure among the entrées, each and every one a palatable dish. The remains of poultry may be potted for the cold-meat table, or converted into curry, sauté de poulet, fricassee de poulet, or put to any of the uses mentioned above for veal. There is no need for waste in a restaurant kitchen. The very bones, with the assistance of the all-important stockpot, may be converted into a variety of soups. To bear out this statement the writer may repeat the remark that a rag-and-bone merchant made to him some years ago: "Hotel and restaurant bones are not worth buying. Them stockpots give 'em such a doing that there's no goodness left in 'em." So we may assume that it is the bones from the private houses that have the "goodness left in 'em".

To Use up Cold Lamb.

Use of Cold Veal.

To Use Cold Poultry.

Especial care should be taken of the liquor in which legs of mutton or chickens and turkeys have been boiled, as these make excellent soups, such as Scotch broth, cockie-leekie, and the like. Although they are not very strong in themselves to start with, they become so with the addition of mutton bones and trimmings from the larder in the case of the former, or chicken, turkey carcasses, and veal bones in the case of the latter. Indeed, these soups when sold advantageously will go a long way to settle the account of the meat that was originally boiled in them. It is in this way that a restaurant kitchen should be able to pay with a good balance on the right side.

Liquor from Boiled Meats.

Perhaps it will be as well at this point to give a couple of typical menus for a restaurant, such as would be suitable for the business indicated above. Of course changes can be

Typical Menus for Restaurants.

made as the season advances, but the variety here indicated will be found sufficient for our present purpose.

Sample Menu, No. 1

Soups

Consommé brunoise, 4*d.*
Scotch broth, 4*d.*
Mulligatawny, 4*d.*
Tomato purée, 4*d.*
Thick mock turtle, 6*d.*

Entrées

Minced lamb and poached eggs, 1*s.* 2*d.*
Mutton cutlets, with peas, 1*s.* 4*d.*
Braised sweetbreads, with tomato, 1*s.* 4*d.*
Tournedos à la Française, 1*s.* 4*d.*
Chicken sauté, 1*s.* 6*d.*

Grilled chop or steak, 10*d.*
Two kidneys, 10*d.*

Cold Meats

Roast beef, 10*d.*
Lamb and mint sauce, 1*s.* 4*d.*
York ham, 10*d.*
Ox tongue, 1*s.*
Pressed beef, 1*s.*

Fish

Fried fillet of plaice, anchovy sauce, 8*d.*
Cod steak, egg sauce, 9*d.*
Small fried sole, tartan sauce, 10*d.*
Brill à la suprême, 10*d.*

Hot Joints, from 12 *to* 3

Roast beef, horse-radish sauce, 10*d.*
Roast mutton, onion sauce, 10*d.*
Roast veal and bacon, 10*d.*
Roast chicken and bacon, 1*s.* 3*d.*

Vegetables

Peas, 4*d.*
Cabbage, 2*d.*
Cauliflower, 3*d.*
Boiled potatoes, 2*d.*
Baked potatoes, 3*d.*

Sweets

College pudding, 3*d.*
Tapioca pudding, 3*d.*
Apple pudding, 4*d.*
Prunes, rice, and cream, 6*d.*
Apple tart and custard, 4*d.*

Cheese, &c.

Gruyère, 2*d.*
Gorgonzola, 2*d.*
Old Cheshire, 2*d.*

Sample Menu, No. 2

Soups

Consommé au Spaghetti, 4*d.*
Thick ox-tail, 6*d.*
Cockie-leekie, 4*d.*
Consommé à la Reine, 6*d.*

Hot Joints, from 12 *to* 3

Roast beef, Yorkshire pudding, 10*d.*
Boiled leg of mutton, caper sauce, 10*d.*
Roast pork, apple sauce, 10*d.*

Grill

Chop, 10*d.*
Steak, 10*d.*
Fillet steak, 1*s.*
Tomato, 4*d.*

Fish

Fried whiting, sauce beurre, 9*d.*
Boiled halibut, Dutch sauce, 9*d.*
Fried fillet of sole, shrimp sauce, 10*d.*
Salmon, parsley sauce, 1*s.* 6*d.*

Hot Entrées

Sauté of rabbit, with mushrooms, 1*s.*
Vienna steak, with fried onions, 1*s.* 2*d.*
Veal and ham patties, 1*s.* 2*d.*
Stewed kidneys, 1*s.*

Vegetables

Brussels sprouts, 4*d.*
Cabbage, 2*d.*
Cauliflower, 4*d.*
Carrots and turnips, 3*d.*
Boiled potatoes, 2*d.*
Baked potatoes, 3*d.*
Fried potatoes, 3*d.*

Sweets

Rhubarb tart, 4*d.*
Rice pudding, 4*d.*
Stewed fruit and custard, 4*d.*
Pastry, 3*d.*

Cheese, &c.

Gorgonzola, 2*d.*
Old Cheshire, 2*d.*
Gruyère, 2*d.*

Sardines (3), 4*d.*
Sardines on toast, 6*d.*

There is not sufficient space here to give a great variety of menus, nor is this necessary, as a competent chef will naturally study the seasons and work up the contents of his larder to the best advantage. Moreover, the tastes of the average person in this country are apt to vary very much according to the district in which he lives. Take as an instance the cottage pie. The writer knows a district in which this economical dish is exceedingly popular, and may be on the menu three or four days a week, its patrons being high-class people too. The way it is made there is as follows. The remains of cold roast beef, lamb, or mutton are cut from the bone, and passed through a mincing machine. This is then stirred into about half its quantity of good boiling brown sauce or gravy, to which a small quantity of finely chopped onion has been added, and if possible some of the meat essence which has run from the joint. Season this up with pepper and salt, and when it is of nice consistency pour it into a pie dish. Have ready some well-seasoned and smoothly mashed potatoes, and spread this carefully over the mixture so as to form a species of pie crust with it. Slightly egg over, bake sharply till brown on the top, and it is ready for serving. Should this pie be served in the dining-room within view of the customers, it may be made more ornamental by a decorative edging of mashed potatoes forced through a large star tube and piping bag. This dish may be popular at any time, but it is especially so in winter, and it is a good line for using up cold joints which may be too much cut down to be presentable on the cold-meat table as they are.

Cottage Pie.

There is an exceedingly popular dish which is invariably to be found on the restaurant menus in Lancashire in the winter time, namely, the Hot Pot. As there seems to be no reason why it should not be introduced in other districts we will give it here. It is perhaps not quite so economical as the preceding, but still it will assist in economizing some of the remnants of the larder. Supposing you have a few

Lancashire Hot Pot.

chumps of mutton (after the loin chops are cut from them) which are eligible, cut them into pieces about 4 oz. each, and if you have any underdone remnants of joints from the previous day these could be cut up also. Remains of stewed kidney may be also utilized, but if none are left, about half a bullock's kidney should be cut up. They use in Lancashire a round fire-proof dish of the shape shown in fig. 165 for the purpose, and the method is to fill this up with alternate layers of sliced potatoes, kidneys, mutton, and beef, and season with pepper and salt. Some prefer a good proportion of sliced onion with every alternate layer of meat, but although this makes it savoury enough it does not suit all palates. A small quantity of onion, however, is always desirable when this dish is almost full. Water is added, and the whole is surmounted with either rather small potatoes or large ones cut in two. It is then baked in a steady oven for a couple of hours, the grease is skimmed off, and it is then fit to serve out in portions. In some places oysters are added either before or after the baking, and they certainly impart an additional savoury flavour to this North Country dish.

Recipe for Hot Pot.

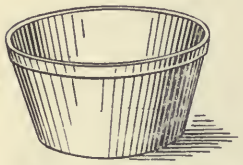


Fig. 165.—Hot-pot Dish

Bouchées and patties may be filled with the remains of minced veal, chicken, turkey, or sweetbreads, and if a little chopped ham or tongue is added, with a few yolks of eggs, and a small quantity of melted gelatine to make it workable when cold, it may be moulded into cutlets or croquettes, crumbed and fried. Sometimes these are served in a napkin or dish paper as a dry entrée, but the writer thinks they go better with a little sauce of some kind and a spoonful of spinach; indeed, they are light and tasty entrées which are not only suitable for the midday lunch, but answer admirably for a ball supper or other function when solidity may not be required.

Bouchées and Patties.

To come to the more solid portion of the menu, such as the joints themselves, it matters not whether the carving table is in an annexe to the dining-room or in the kitchen, but great care should be taken in this department. The writer has heard it asserted that "a good carver is born, not made"—indeed, a really good carver will save his wages by the skilful manipulation of the joints and poultry; and if he is quick withal he is invaluable, for he not only economizes the joints themselves but makes an appetizing display on the plate for the diner, and leaves no waste behind him. Considerable waste may be made in the placing of food on a plate, whether it be soup, fish, entrée, or joint, and it is as bad to err on the side of plenty as on that of defect. An overdose of sauce for the fish or entrée, or too much gravy for the joint, gives them a messy appearance, and tends to take away the recipient's appetite before he attempts to partake of it. Vegetables are usually served separately on small dishes, so that the diner can help himself.

Importance of Carving.

The system of checking and giving orders varies considerably. There

A RESTAURANT INTERIOR

are plenty of places where the old-time system of paying the waiter or waitress and getting a small check receipt is in vogue, but perhaps the most expeditious and business-like is when the waiter or waitress carries a check book with counterfoil, and after noting the extent of the customer's lunch, gives him or her a check for the amount, which is handed in at the cashier's desk with the payment. This, of course, refers to the dining-room itself, but everything served from the kitchen should be checked also. The best plan for this is to have a blackboard with hooks or spikes on which to hang waiters' checks for everything served from that department, these being collected after the business is over by the clerk or cashier, and compared with the waiters' check book and cash taken. By these means the amount of profit on each joint may be arrived at.

System of Checking in Dining-Room.

Checking in Kitchen.

There is one important piece of furniture which is often neglected in the larder, and that is the weighing machine, for incoming goods should be weighed and checked, and the invoices should be collected weekly or monthly as the case may be, to compare with the tradesmen's accounts. By these means the incoming and the outgoing are always under the observation of the chef, and it will naturally enough be to his interest to make the department that he controls a paying concern.

Checking Goods Received.

CHAPTER XLVII

THE MANAGEMENT OF A RESTAURANT

What a wide field for research is covered by the above heading, not only for the customer himself, but also for the proprietor, the manager, and the whole of the staff right down to the scullery man! There are restaurants and restaurants, of course, and they vary in their character in much the same way as their not very distant relations, the hotels. There are the highly decorated and high-priced restaurant palaces of the metropolis, and those which are scarcely less palatial in the larger cities and towns of the provinces. There is also a second, third, and even fourth grade (possibly more than that) all floating under the title of restaurant. Whatever the grade, there is one common aim for the proprietors, namely, to keep them floating and to show a good profit if possible. Let us dwell for a brief space on the upper middle class restaurant, for what might be called second class in London would answer very well for first in the provinces. The business men of the town generally patronize these, and fair but not exorbitant charges are made as a rule. Fair prices, with a reputation for viands of good quality, are a greater advertisement for restaurants of this description than a richly

Classes of Restaurant.

London and Provincial Restaurants Compared.

uniformed doorkeeper or an elaborately decorated interior; for the average Briton sees more beauty in a nicely grilled and juicy mutton chop or steak than he does in a blue and gold dado. Restaurants can be made inviting without undue decorations, and the good things on the menu should always be in the front rank of the attractions laid out to entice the man about town. Feed him consistently and let him pay reasonably and he will not only come again himself, but will probably

To Hold Customers.

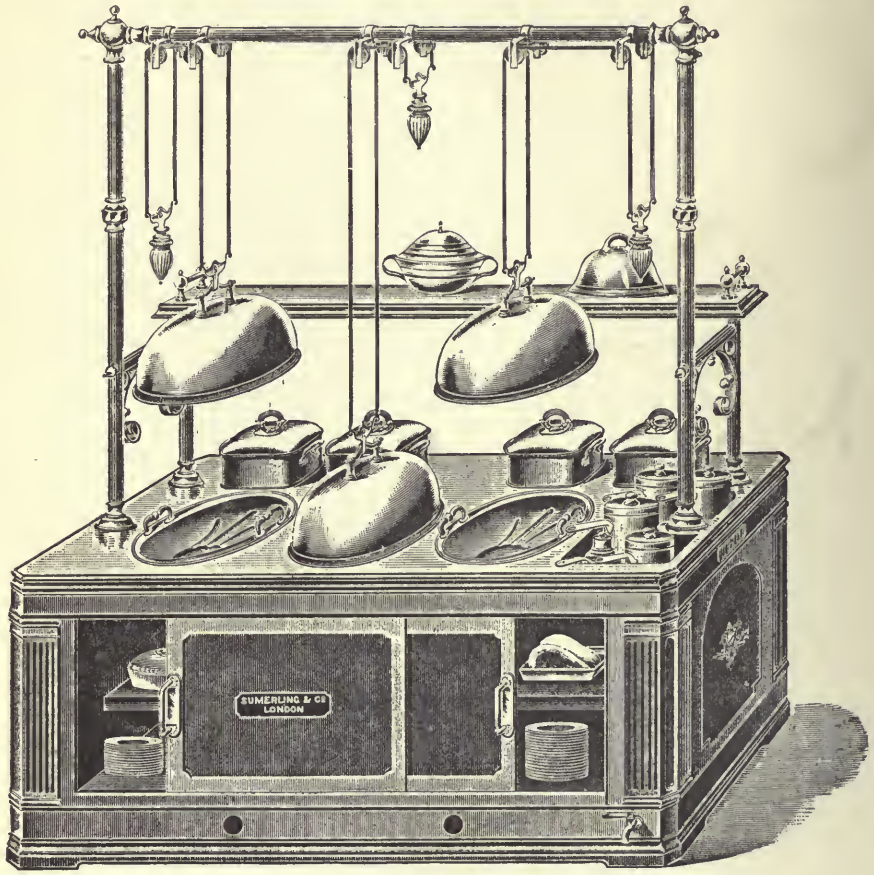


Fig. 166.—Carving Table with Covers

bring his friends; in fact, he will become a walking advertisement for the establishment. On the other hand, give him plenty of gold and glitter and let him depart almost as hungry as when he entered the door, and he won't forget it, neither will he forget to talk about it, so that he becomes an advertisement in this case also.

A Restaurant for 200.

In the working of a restaurant which, we will assume, is capable of supplying about one hundred and fifty to two hundred meals per day, a manager is generally appointed, unless the proprietor himself superintends matters. In the latter case he may

have a sub-manager, who may look after the books as well, and represent the chief during his temporary absence, check wines from the cellar, &c. A cashier, either male or female, is essential in the busy part of the day, a head and second waiter assisted by waitresses, a plate man, who may also assist a light porter in doing heavy cellar work in the morning, and a good carver, who is generally a half-day man—that is, he commences his duties, perhaps with the cutting of chops and steaks about 11 a.m. and finishes about 4 o'clock. In the busy time (between 12 and 3) of cutting joints, &c., one of the younger assistants from the kitchen can be spared to assist him. About 3.30 there is a general clear up—the waitresses see to tablecloths and serviettes, the light porter looks after knives and forks, and so on; a few of the staff being told off to look after possible teas, which generally commence about this time.

The Service Staff.

Staff for Carving.

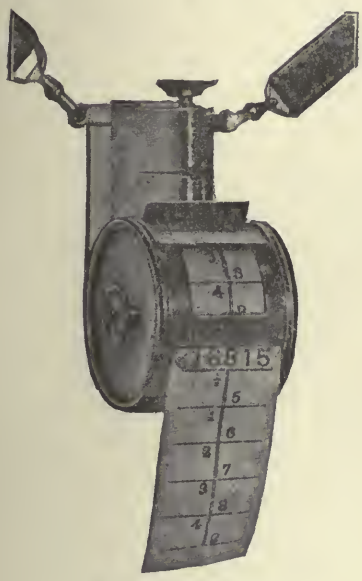


Fig. 167.—Ticket Punch

The all-important parts of the day's programme consist in giving satisfaction to the customers and in the accurate checking of accounts. The last item of course has to answer the vital question as to whether the concern is floating with a profit or sinking with a loss. To keep a proper check on the kitchen or service staff each waitress should be provided with checks or tokens representing portions of different values of vegetables or meats, which she should pay to the carver or server as the portions are taken away. It is necessary to provide the waiters and waitresses each with a check book, which is manufactured for the purpose and has a distinctive number attached. There is a counterfoil to each leaf, with soup, fish, entrées, poultry, joints, &c., thereon. The waitress makes a double entry, and tears off a leaf which serves as the bill to the customer, and he in his turn takes it to the cashier's desk as he departs, and pays the amount. The cashier files the small bill for future reference, and so the business proceeds to the end of a restaurant day, which is generally about 6.30 or 7 o'clock, although in London some places keep open till 12, but it depends on the district. An ingenious device is in use in some restaurants in which a large business is done, in the form of a ticket punch (fig. 167) carried by the waitresses. A ticket is torn from the strip and punched against the price of the article supplied, and as this is done at the time of serving there is no danger of any item being forgotten, as happens sometimes in the busy part of the day when a waitress is attending to several customers at the same time. The customer hands

Checking Accounts.

Check on Kitchen.

Checks on Waiters.

in the punched slip in the usual way at the pay desk. The last duties in the desk department are, to count up the checks, to add up the sum recorded thereon, to see if it tallies with the cash in the till or cash register, and to enter that sum in the Day Cash Book, which should be ruled so that there is a heading for Meals, another for Bar (drinks, &c.), and a column for Total. At the end of the week these daily accounts should be inserted in a Weekly Cash Book, showing total amount for each day during the past week. At the end of the month stocktaking should be done, and tradesmen's bills compared with takings, giving credit, of course, for amount of stock in hand. This plan carried out regularly will show unmistakably the balance of profit in hand—independent of the fact that all tradesmen should send in a check with each lot of goods delivered. During the week they should send in also a weekly account, and their book at the end of the month, when the account should be settled. This gives the firm's representative a good reputation for paying, also an independent right to go elsewhere if the goods are not of the quality required or demanded, besides the knowledge of the fact that the banking account is absolutely sound.

Books to be Kept.

Monthly Stocktaking.

Checking Tradesmen's Accounts.

As already noted the best draw for a restaurant is the good quality of the refreshment to be obtained there, whether it be for eating or drinking. Even with those valuable assets, however, the general good management of the establishment is absolutely essential. There is, of course, a great amount of responsibility on the manager, who has to show great tact and even affability occasionally under trying circumstances, for accidents will happen and oversights occur even in a restaurant. Little less in importance to the manager are the chef and head waiter, the former being mainly responsible for the good things to be served, and the waiter and his staff for the proper serving of them.

Importance of Chef and Waiter.

The carver follows closely, if he is not exactly in social position equal to the last two; his post is important all the same, and a good quick and clean carver will earn his wage by the dexterity and economy of his methods, whereas a bad carver will not only cut to waste, but his plates will have an uninviting appearance, although the quality of the meat served may be first-class.

The Carver.

The writer recommends the plan of keeping a diary, in which may be recorded the fluctuations in the price of meat from one year to another, also those of fish and vegetables. By these means the profit on a joint of ribs of beef, weighing say 25 lb. at the time of roasting, may be ascertained, the same with 1 cwt. of potatoes, and so forth. A petty cash book is also indispensable, for slight and unforeseen expenses occur almost daily, which should on no account be entrusted entirely to memory, as it very often causes confusion when it comes to the counting up of the day's takings.

Diary for Prices.

Petty Cash Purchases.

Although the employment of a good reliable carver is here advocated, it will be always found a very great advantage if the manager

and his deputy make themselves efficient in this important line. A sudden indisposition of the regular man with no one else available at the time may necessitate such assistance, or even an extra rush of business through some important event taking place in the town will cause a sudden influx of customers, who are as a rule very impatient, and the more quickly they are served the better it is for all concerned. It is in this emergency that the manager would shine if he were expert with the carving knife, and having "stemmed the tide" so to speak, he could leave the regular man to his post. This knowledge of carving is not at all unusual either in managers or even proprietors of restaurants and hotels; indeed, the writer knows more than one of the latter class who can give most carvers a long start in the manipulation of the carving knife, and take a great interest in it,

Manager's Ability to Carve.

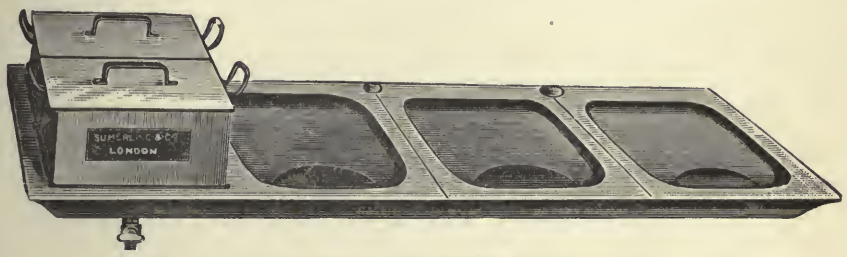


Fig. 168—Cutting Table for small Restaurant with Enamelled Vegetable Dishes

knowing as they do the great importance of that branch of the business, and that the carver is often the man on whom profit or loss depends.

Perhaps a few general hints on the art of carving will not be out of place at this juncture. They may be of some use to the inexpert, and may act as a slight incentive to some readers to acquire a practical knowledge of an art which should be known in every household; for who has not in his travels at some time or other seen a leg of mutton or a piece of beef "half murdered" by bad carving, and when placed on the table as a cold joint for lunch or supper presenting the appearance of having been "mauled" by the lodging-house cat, the result of bad and wasteful carving. Every father and mother should acquire a knowledge of carving, for there is woeful waste in private houses for the lack of it, and singular to say, those who have been in service and even those from the mansions of the rich are generally the worst offenders.

Hints on Carving.

In taking on a carving job either in public or private the all-important utensil is a good keen-edged carving knife. There are three or four patterns for meat, a round-of-beef carver being of a totally different type to that used for ribs or poultry. All these should be kept sharp, and the two last somewhat stiff in the blade, for if they have a tendency to bend like the round-of-beef carver you will unwittingly get into the habit of "scooping" the meat, whereas it should be

Knives for Different Purposes.

kept straight and clean cut, so that the remains of a "ribs of beef", which has been served hot, may present a trim appearance on the cold-meat table next day. Economical carving should follow it even there till it is neatly carved to the very bones, which may in their turn be committed to the stockpot, helping others of a like nature to make the soup.

Choosing the Joints.

In choosing joints of beef for roasting, the standing ribs are the best for carving and the most economical, and a piece of say 25 to 30 lb. from the right side of the bullock is the best. In the cutting the butchers are very fond of getting too far into the shoulder. This causes unavoidable waste, as he cannot get nice slices from this part, but if he just encroaches on the blade bone with his knife all will be well. All these joints, from whichever side of the beast they may come, should be cut (when cooked) in the same way, that is to say, the thick or chine end should be away from you,

How to Carve a Joint.

and then you cut from the left side. Paradoxical as it may seem, this is called right-hand carving, whereas if you cut from the right it is left-handed. A man used to cutting one way finds it awkward to continue a joint begun in the other way.

Carving a Sirloin.

Following the standing ribs is the time-honoured sirloin of beef. This is carved in an entirely different way to that adopted with the ribs. The fillet side being uppermost, it is cut completely across, but when the fillet side is used up, the joint is turned over and then treated the same as if it were a "ribs". This is not such a paying joint, however, for the price is usually high, and there is a good deal of fat attached which cannot be used up in the carving. Moreover, everybody expects fillet from a sirloin, and of course this will not go very far unless you have an extra piece of fillet roasted, at the side of the dish to eke it out.

Boiled Round of Beef.

A boiled round of beef, with dumplings, or carrots and turnips, on the other hand, is practically all economy, for, with the entire absence of bone, it can be carved out to the last ounce almost. A special carving knife is used for this—long and straight in the blade—and if this knife is sharp, a fine spread of thin slices can soon be made by carving away at the top, and holding the knife in a horizontal position. If it is not desirable to have the entire round, a silver side, which is a section of the round, may be used with advantage, in which case it may be cut either horizontally or vertically, according to the size of the joint.

Leg of Mutton.

Legs of mutton, provided they are of good size and quality, may be counted among the profitable joints. These may be carved in slices from the centre at first, and then turned over and carved from the other side, until little but the bone remains. The haunch of mutton, consisting as it does of loin and leg attached, if carved in a legitimate way, is rather wasteful; but a great many treat it as a hind quarter of lamb, in which case the loin part is jointed, so that the carver can serve this part in chops, with perhaps a slice from the leg if the mutton is not large. Saddles of mutton are too extravagant for ordinary restaurant work, although suitable for special dinners, in which case they

A RESTAURANT DINING-ROOM

may be cut straight down on each side of the bony ridge in the centre. Hind-quarters lamb is always jointed at the loin, and may be served as the haunch of mutton as described above. Fore-quarters lamb should be carefully jointed before it is cooked. This makes it easy enough to carve. Serve a small cutlet or chop with a piece of the breast to each guest.

Haunch of Mutton.

A leg of pork should be well "scored" and slowly and thoroughly cooked before serving, when it may be carved like a cold ham. A neck of pork should have the chine or backbone taken away with a saw before cooking, and if it has the skin on, should be well scored, which will make it a very easy joint to carve.

Carving Leg of Pork.

Turkeys, geese, ducks, and chickens now come under our notice. A large meaty turkey, accompanied by sausages or other garnish, will generally cut out well. It is a good plan to take off the legs in advance, and cut the meat from them in slices, keeping this warm around the dish, so that when plates of turkey are called for, a slice from the leg and one from the breast may go on each plate, accompanied by stuffing, sausage, &c. In this way the legs get used as well as the breast. Geese may also be used up like this if large, but if on the small side the leg may be chopped in about three portions, each accompanied by some of the breast, with apple sauce, stuffing, &c. Fowls will generally run into four portions, and ducks into five; spring chickens into two, and ducklings into three. In the case of fowl a distinction is made between leg, wing, and breast portions, ham, bacon, or tongue being served with it. Duck may be carved in a similar way to fowl; so with pheasant, but being rather more meaty a few slices may be taken from the breast to go with the legs. Pigeons and partridges may be served half for a portion, the same with quails; in the case of the latter the portion is usually served on buttered toast.

Carving Large Fowl.

Fowls, Ducklings, &c.

A haunch of venison is not a very common luxury on the ordinary restaurant carving table; but sometimes at special dinners this noble dish may be on the menu, served with red-currant jelly and port-wine sauce. This should not be jointed in any way, but dished with the fat side upwards. It should be cut so that a portion of fat and one of lean, neither of them too thin, may be served on each plate with French beans if procurable. This is the orthodox way of carving a real haunch of mutton too; but, as before stated, it is not the most economical way.

Haunch of Venison.

Necks and loins of veal may be treated the same as pork, leaving out the apple sauce and sage and onions, of course. A fillet of veal with stuffing in the centre is treated as a round of beef. Almost everyone can carve a ham, but those from the right side of the pig are easier to manipulate than those from the left. A tongue may be cut from the centre, first using up the ends with the best slices in as neat a manner as possible. Practice, however, will do more for the reader than a volume full of instructions.

Veal, Ham, and Tongue.

The kind of fittings in the restaurant must depend on the amount of business done, but it is better to obtain appliances specially made for the work required than to makeshift with any sort of expedient which, as likely as not, may only serve to spoil the food after it is cooked. In restaurant business food has always to be kept in as good a condition as possible for some three or four hours after it is first ready, and it is on the way that things are managed during this waiting period that the satisfaction of customers depends. If the meat is made stringy by overcooking, or leathery by being dried, or the vegetables become stewed and sodden, the growth of trade becomes hopeless. Even for small restaurants useful appliances have been designed by which joints and vegetables can be kept in a condition nearly as good as when first cooked, and plates can be kept always hot, the whole requiring little outlay after the first cost of the apparatus. In the large restaurant much of the cooking is done by steam, and carving tables and other appliances are kept highly heated by the same means, the steam being carried by pipes from a pressure boiler situated in some place away from the kitchen. The carving table shown in fig. 166 (p. 242) does not require any separate steam supply, but is entirely self-contained. Underneath the bottom steam-generating pan a patent atmospheric gas burner is provided. By filling the generator with water and lighting the gas, steam is obtained in about thirty minutes. The steam is driven to the top of the hot closet, and the whole of the apparatus is made thoroughly hot. The gas can then be lowered sufficiently to keep the water boiling. The hot closet becomes charged with hot moist air, which does not dry up the food or give off obnoxious fumes.

Restaurant Fittings.

An Efficient Carving Table.

The restaurant-keeper has to supply the legitimate wants of his customers, but has frequently to pander to their fads and idiosyncrasies. The grill room is an institution designed principally for this end. Some men are extremely particular as to the quality and condition of their chop or steak when cooked. They like to select it while in the raw state, and have it grilled in their presence on a "silver grill". It is only in very busy restaurants that this department can be made to pay the proprietor, as the grill cook may have very frequent intervals of waiting, and the usual prices obtained for grills are not sufficient to allow a very large margin. Although it may for a little please some customers to have a separate grill in a grill room, it is probably much more satisfactory and profitable in the long run to have the grills cooked in the kitchen, as part of the ordinary work, depending on the excellence of the cooking as the recommendation, and as compensation for the work being done out of sight.

The Silver Grill.

In the restaurant it is a good plan to have all the cold joints intended for the day's service set out in neat array on a long table in some convenient position near the entrance to the dining-rooms, so that customers when they enter may have their appetites or their fancy stimulated by the good-looking joints or cold sweets of any

Setting Out Cold Joints.

kind. It is, of course, always necessary to keep the small and mean-looking joints out of sight, although they may appear on the menu if there is still good cutting on them.

It is a growing feature in many restaurants of the middle class to supply a *table d'hôte* luncheon or dinner at a very reasonable price—usually two prices, in fact, 1*s.* 6*d.* and 2*s.* 6*d.* It is surprising how many people enter a restaurant hungry, and have hardly any idea what they would like to eat. The luncheon on the menu gets over their uncertainty, and in most cases gives satisfaction because of its variety, when a choice from the ordinary menu may be very disappointing and more expensive. The table d'hôte system has this advantage for the restaurant proprietor, that it secures something like an even consumption of all the dishes cooked for the day, and obviates the difficulty arising from the indiscriminate choice of customers, namely, a run on one dish and its speedy exhaustion, while another is partly wasted for the want of customers. The simplest and oldest form of a set luncheon or dinner with us is, of course, the old country hotel "ordinary", consisting of a cut from the joint and two vegetables with pudding; but the modern restaurant is run on more ambitious lines, and follows the methods rather of the Continental café. There is nothing in the table d'hôte luncheon that is not offered also on the same day in the general menu, but the portions in the former are much smaller, and nicely graduated to the whole price charged; then in entrées, or joints, or sweets, an alternative of one kind or another is allowed, and in some cases the customer is given the choice of soup or fish, and of sweets or cheese. The difference between the cheaper and dearer luncheons is usually less in kind than in quantity and variety. Thus, for 2*s.* 6*d.* one course more may be provided, and the portions of each course made a little larger. Many menus might be given of popular luncheons of this kind, but the following, which is taken from the card of a successful provincial café, may serve as an indication of what can be profitably supplied, remembering at the same time that the washing up for this kind of trade is very largely increased over that required for meals *à la carte.*

Table d'Hôte Luncheons.

Country Hotel Ordinary.

Variety the Essential.

TABLE D'HÔTE, 2*s.* 6*d.* (SIX COURSES)

Served from 12 noon to 3 p.m. Also from 6 to 9 p.m.

Soup

Consommé aux Nouilles. Thick spring.

Fish *Entrée*

Boiled haddock. Egg. Ice. Curried chicken.

Joint

Steak and kidney pudding. Roast lamb.

Sweets.

Raspberry and currant tart. Jam roll.

Cheese

Special Table d'Hôte (Five Courses)

12 to 3, 1s. 6d.

Consommé aux Nouilles. Thick spring.

Fillets sole.

Steak and kidney pudding. Cutlets and peas.

Fruit jellies. Stewed apples.

Cheese

The prices charged for dishes must depend on the locality, and the nature of the trade, but the following may be considered as reasonable anywhere. This is an actual menu from a popular West of England restaurant.

Soups

	s.	d.
Real turtle, *10 mins.*	3	6
Consommé vermicelli	0	6
Consommé with poached egg...	0	9
Tomato soup	0	6
Gravy	0	4
Thick mock turtle soup ...	0	6
Ox tail	0	6
Mulligatawny	0	6
Consommé macédoine... ...	0	6
Thick vegetable	0	6
Pea soup	0	6

Fish

Regulated by market prices.	*From* s.	d.
10 mins. fried or grilled sole ...	1	9
10 „ fillets of sole, vin blanc	1	9
10 „ lemon sole	1	0
10 „ whiting, tartare sauce	0	10
10 „ fillets of plaice, lemon	0	10
10 „ hake steak „	0	10
10 „ cod steak „	0	10
Whitstable oysters (selected), with brown bread and butter, per dozen	2	6

Entrées

	s.	d.
10 mins. ox tongue, sauce piquante	1	3
10 „ mutton cutlets and peas	1	3
25 „ Surrey chicken sauté chasseur	2	0
20 „ calf's sweetbread aux jus...	1	6
30 mins. Bordeaux pigeon en compôte	2	0
Calf's head vinaigrette ...	1	6

Savouries

	s.	d.
Anchovies, plain	0	6
Anchovies on toast	0	8
Buck rarebit	1	0
Macaroni au gratin	0	10
„ italienne	0	8
„ milanaise ...	0	8
Sardines on toast	0	8
Scotch woodcock	1	0
Soft roes on toast	0	9
Spaghetti au gratin	0	9
Welsh rarebit	0	8
Terrine de foie gras ... from	2	6
Astrakhan caviar ...per pot	3	6
Golden buck	0	9

Ready Dishes

From 12 to 3 and 6 to 9.

	s.	d.
Boiled haddock	0	10
Fillets sole	1	0
Salmon...	1	6
Curried chicken	1	3
Roast lamb	1	2
Cutlets and peas	1	3
Steak and kidney pudding ...	1	0

Grill

	s.	d.
Bordeaux pigeon	1	9
Chateaubriand, sauce bernaise	4	0
„ plain	3	6
Entrecôte steak	2	6

	s.	d.
Entrecôte steak (double) ...	4	0
Fillet steak	1	3
Grilled bone	1	0
„ devilled	1	3
Grilled ham or bacon	0	10
Half grilled fowl and ham ...	3	0
„ chicken à la diable	3	0
Kidneys (two), plain	1	0
„ „ devilled or on toast ...	1	3
Mutton chop	0	10
Chump chop	1	0
Mutton cutlets (two)	1	0
Porterhouse steak for two ...	3	6
Sausages (two)...	0	6
Rump steak	1	0
Tomato...	0	4
Steak and chips	1	2

Sauces

	s.	d.
Horse radish	0	6
Maître d'hôtel butter	0	4
Tomato...	0	4
Tartar or mayonnaise	0	4

Vegetables

	s.	d.
Braised onions...	0	4
Braised tomatoes	0	6
Cabbage	0	2
French beans	0	4
Carrots...	0	2
Cauliflower	0	3
Brussels sprouts	0	3
Mashed turnips	0	3
Spinach	0	4
Peas	0	3
New potatoes	0	3

Potatoes

Potatoes, boiled, 2*d*. Chips, 3*d*.
Baked, 2*d*. Fried, 2*d*. Lyonnaise, 4*d*.
Maître d'hôtel, 4*d*. Mashed, 3*d*.
Sauté, 3*d*. Straw, 3*d*.
Rissolé, 4*d*.

Cold Joints, &c.

	s.	d.
Lamb and mint sauce	1	0
Roast beef	0	10
York ham	0	10
Ox tongues	1	0
Surrey fowl, wing portion ...	1	6
„ „ leg „ ...	1	3
Chicken and ham or tongue ...	1	6

Salads

	s.	d.
Potato	0	4
Tomato...	0	6
Mixed salad	0	6
Celery	0	2
Asparagus	0	8

Sweets

	s.	d.
Meringues à la Chantilly ...	0	6
Pineapple fritters	0	6
Fruit salad, *a spécialité* ...	1	6
Stewed apricots	0	6
Stewed pears	0	6
Apple tart and cream	0	6
Fruit tart in season	0	6
Ices	0	4

Fruits

	s.	d.
Bananas	0	2
Pineapple	0	9
Oranges	0	2
Grapes	1	0
Tangerines	0	2
Pears	0	3
Raspberries and cream ...	0	6

Cheese, &c.

	s.	d.
Camembert	0	3
Cheddar	0	2
Gruyère	0	3
Stilton	0	3
Gorgonzola	0	3

Sundries

	s.	d.
Small pot of tea for one ...	0	3
Coffee, per cup, large with milk	0	4
Coffee, Turkish, *spécialité* ...	0	6
Cream	0	2
Two eggs with ham or bacon...	1	0
Eggs, fried (two)	0	6
Eggs on toast, poached ...	0	8
Eggs, scrambled	0	8
Mango chutney	0	2
Milk, per glass...	0	2
Omelette, cheese	0	8
„ ham	0	10
„ jam...	0	8
„ kirsch	1	3
„ kidney	1	0
„ plain	0	8
„ rum...	1	3
„ savoury	0	8
„ sugar	0	8

	s.	d.
Omelette, tomato	1	0
Olives, Spanish	0	6
Pancakes	0	4
Pickles	0	2
,, mixed	0	2
,, onions	0	2
,, piccalilli	0	2
,, walnut...	0	2

	s.	d.
Red-currant jelly	0	2
Sardines	0	6
Sandwiches	0	3
Roll or bread	0	1
Butter	0	1
Dry toast	0	2
Buttered toast	0	3
Biscuits...	0	2

The following is the menu of a popular London suburban restaurant:—

Soups

	s.	d.
Clear—Pontoise	0	6
Mock turtle	0	6
Sevigné	0	6
Thick—Bisque de homard ...	0	6
Jenny Lind	0	6
Purée game	0	6

Fish

	s.	d.
Boiled turbot, prawn sauce ...	0	10
Cod, oyster sauce	0	10
Fried fillets of sole, tartar sauce	0	10
Smelts, citron sauce	0	10

Entrées

	s.	d.
Tournedos and mushrooms ...	1	3
Chicken sauté à la Marengo ...	1	3
Sweetbreads and peas... ...	1	3
Curried fowls	1	3
Braised ox tongue and spinach	1	3
Mutton cutlets and grilled tomatoes	1	3

Joints

	s.	d.
Sirloin of beef, Yorkshire ...	1	0
Saddle of mutton	1	0
Fillet of veal and bacon ...	1	0

Poultry, Game

	s.	d.
Roast duck, apple sauce ...	1	6
Boiled fowl, celery sauce and ham	1	6
Roast pheasant and chips ...	1	6

Sweets

	s.	d.
Apple and cranberry tart ...	0	6
Herodotus pudding	0	6
Wine jelly	0	6
Pears and cream	0	6
Compote of fruits	0	6

Grill

	s.	d.
Rump steak	1	0
Mutton chop	1	0
Kidneys and bacon	1	0
Mixed grill	1	0
Devilled leg	1	0
Fowl and ham	1	0

Cold Dishes

	s.	d.
York ham	0	10
Ribs of beef	0	10
Galantine of chicken	0	10
Ox tongue	0	10
Fowl and ham	0	10

Vegetables

	s.	d.
Potatoes—Boiled, fried, sauté, mashed, rissoles, roast ...	0	3
Cauliflower, sprouts, cabbage...	0	3
Braised leeks, dressed spinach, peas	0	3

Sundries

	s.	d.
Boiled egg	0	2
Poached egg on toast	0	4
Omelette, savoury	0	6
Omelette, sweet	0	6
Sardines on toast	0	6
Welsh rarebit	0	6
Tomato salad	0	4
French salad	0	6
Plain salads	0	4
Lettuce	0	2
Watercress	0	2
Pickles	0	2
Chutney	0	2
Butter	0	1
Cheese	0	2
Tea, cup	0	3
,, pot, roll and butter ...	0	5
Coffee, cup	0	3
Cocoa ,, ...	0	3
Chocolate, cup...	0	4
Roll and butter	0	2
Toast, buttered, per round ...	0	2

SCHEME FOR A TEA ROOM AND CLUB ROOM

Some of the dishes here given are seasonal, and would be left out of the menu when not in season or not to be obtained at a reasonable price. It is always better to charge a moderate price and secure many customers than to be exacting and secure only a few. It is the appearance and general air of the restaurant that secure the popularity and large clientèle, and not the exclusiveness which is obtained by high prices. The best kind of customer of moderate means likes everything clean and quiet and comfortable, and above all likes to be courteously or even genially treated, but never objects to be moderately charged. Moderate charges in fact confirm such customers, and induce them to make the restaurant their home from home, where they entertain their friends, and bring their acquaintances as customers also.

Dishes in Season.

Moderate Charges.

CHAPTER XLVIII

LUNCHEON AND TEA ROOMS

There is no clear line of demarcation between the restaurant proper and the modern luncheon and tea room. The restaurant is assumed to supply substantial and hot meals at almost any hour of the day or evening; the luncheon room confines its hot luncheons to a few hours in the middle of the day, but supplies cold meats, tea, coffee, &c., at any time during business hours; the tea room is open for the vending of tea, coffee, cocoa, milk, aerated waters, &c., the hot-meat dishes being confined for the most part to chops and steaks, while cold meats sold are in the form of sandwiches, pies, patties, or plates of ham or cold beef with salad. A luncheon room can only be profitably conducted in those neighbourhoods where a good many business people, clerks, &c., are employed, who live too far from their homes to enable them to go there for their midday meal. The tea room thrives best at popular resorts in the country, or at the seaside, or in shopping and busy thoroughfares in towns, where people may want refreshments of a light sort to tide over the few hours till they return home. It is a mistake to endeavour to make a restaurant trade in a neighbourhood only suited for a tea shop, but it is equally a mistake to keep the latter kind of establishment with no sort of substantial fare on the menu. There are always a good many customers who do not care for sweetmeats, even with tea or coffee, and it is well to have something savoury to offer them. The tendency is for the tea-room establishments to broaden their menu towards that of the restaurant. This tendency is especially noticeable in London, where the remarkable success of one large catering company in the tea-shop line has been in great part due to the variety on its menu, while the seemingly declining fortune of another large company, longer established, is probably due to the narrowness of its methods and the persistence in character of

Definition of a Tea Room.

Savouries in Tea Shops.

supplies of which people have become weary. The menu and prices of a leading London firm are given here.

Tariff of Leading Tea Shops

Special To-day

Blackberry and apple tart, 2*d.*

Tea Specialities

Rock buns, Madeleine cakes, Congress tarts, jam tarts, shortbreads, sponge sandwiches, cocoanut, macaroon, and raspberry buns, each 1*d.*

Beverages

China tea, per cup 2*d.*; per pot per person 3*d.*
Tea freshly made for each person, per cup 2*d.*; per pot per person 3*d.*
Coffee, per cup 2*d.*
„ black, per cup (small) 2*d.*
„ „ „ (large) 3*d.*
Chocolate (speciality), per cup 2*d.*
Cocoa, per cup 2*d.*
Milk, per glass 1*d.*
„ (hot), per glass 1*d.*; per cup 2*d.*
Cream (preserved), 1*d.* and 2*d.*
Bovril with hot milk, per cup 3*d.*
„ with biscuits, „ 3*d.*
Egg and milk, 3*d.*
Soda and milk, small 1½*d.*; large 3*d.*
Caley's table waters, 2*d.*
„ brewed ginger beer, 2*d.*
Proset, per bottle 2*d.* and 3*d.*
Schweppe's lemonade, large 4*d.*
„ soda, seltzer, and potass waters, large 4*d.*
„ ginger ale, "dry" or "sweet", large 4*d.*
Lemon squash, 4*d.*
Rose's lime juice cordial, per glass 2*d.*
„ lime juice cordial and soda, small 3*d.*
„ lime juice cordial and soda, large 4*d.*

Hot Meat, Pies, &c. Served from 12 *till* 3

Stewed steak with tomato sauce, 6*d.*
Curried beef with rice, per portion 6*d.*
Irish stew, per portion 6*d.*
Steak and kidney pie, per portion 6*d.*
Rumpsteak and kidney pudding, each 6*d.*
Veal patties, each 3*d.*

Vegetables

Potatoes, per portion 2*d.*
Macaroni with tomato sauce, 2*d.*
Fresh spinach, 2*d.*
Fresh spinach and poached eggs, 6*d.*
Haricot beans with tomato sauce, 2*d.*

Cold Meats

Veal and ham pie, per portion 6*d.*
Veal, ham, and egg pies, each 6*d.*
Roast beef, per plate 6*d.*
Pressed beef or ham or tongue, per plate 4*d.*

Cold Fish

Fried fillets of fish (two pieces), per portion 6*d.*
Fish rissoles, each 3*d.*
Soused herrings, each 2*d.*

Sweets

Baked apple dumplings, each 3*d.*
Baked pear puddings, each 3*d.*
Marmalade pudding, per portion 3*d.*
Tapioca pudding, per portion, 3*d.*
Bananas with cream or custard, 3*d.*
Fruit pudding, each 3*d.*
College pudding, each 3*d.*
Stewed figs, 2*d.*; with custard or cream, 3*d.*
Stewed apples, 2*d.*; with custard or cream, 3*d.*
Stewed prunes, 2*d.*; with cream, custard, or rice, 3*d.*
Fruit tart (cold), 3*d.*; with cream, 4*d.*
Rice and jam, per portion 3*d.*
Trifle with custard, 3*d.*

Sundries

Soft herring roes on toast, per portion 2*d.*
Butter, per pat 1*d.*

Canadian Cheddar cheese, per portion 1*d.*
Ham sandwiches, each 2*d.*
Welsh rarebit, per portion 3*d.*
Poached eggs on toast, 6*d.*
Poached eggs on macaroni, 6*d.*
Eggs, boiled, hard boiled, or poached, each 2*d.*
Croquettes (veal, ham, and tongue), 2*d.*
Smoked breakfast sausage, 1*s.* each; portion 3*d.*
Cambridge or smoked sausages, each 2*d.*
Sardines on toast, 4*d.*
Sardines, each 1*d.*
Pickles (Lazenby's), 1*d.*
Chutney, per portion 1*d.*
Tomatoes, per portion 2*d.* and 3*d.*

Bread, Cakes, and Pastries

Batons or crescents, 4 for 3½*d.*, or 7 for 6*d.*; each 1*d.*
Bread and butter, two slices 1*d.*
Bread, per portion 1*d.*
Rusks, ½*d.* each, with butter 1½*d.*
Bath bun, 2*d.*
Plain bun, 1*d.*
Biscuits, various, 1*d.*
Chocolate wafers, 1*d.*
Ginger biscuits, 1*d.*
Cake, cherry, per piece 2*d.*
,, almond pound, per piece 2*d.*
,, Dundee, per piece 2*d.*
,, Genoa, per piece 2*d.*
,, lunch, per piece 1*d.*
,, sultana, per piece 2*d.*
,, seed, per piece 2*d.*
,, tennis, per piece 2*d.*
Scotch gingerbread, per piece 1*d.*
,, oatcake, 1*d.*
,, shortbread, rich, 2*d.*
Swiss roll, piece 2*d.*
French pastries, each 2*d.*
Viennese pastry, piece 2*d.*
Russian pastries, each 2*d.*
Lemon cheese cakes, each 2*d.*
Meringues with cream, each 2*d.*
Scones, sultana, each 2*d.*
,, half toasted, with butter, 2*d.*
Toast, dry, per round 1*d.*
Toast, buttered, per round 2*d.*
Toasted bun or sultana scone, each 2*d.*
Jam, apricot, black currant, raspberry, or strawberry, 1*d.*
Honey or marmalade, 1*d.*

To ensure success it is not necessary that a light-refreshment establishment should be elaborately fitted or luxuriantly furnished, but it should be at once dainty and cosy. It gives a decided air of substantiality to a place when all the crockery has the name of the proprietor or of the tea room printed on it; but whatever kind of crockery-ware is in use it should, as nearly as possible, be all of one pattern, and cracked or chipped cups and saucers should on no account be offered to customers. A warning on this point may seem unnecessary, but in some establishments that make pretension to respectability, and that are well patronized, cracked and chipped cups and saucers are much too common, and in consequence customers are loud in complaints; and these firms seem to be gradually losing their position in the front rank. People used at home to having their meals set before them in a clean, tidy, and enticing fashion, resent any tendency to slovenliness in a luncheon or tea room, feel the food distasteful, and regard such service as discourteous. What is true of crockery-ware is even more true with regard to clean cloths on the tables. It may not be always possible to use the finest damask tablecovers in an ordinary second-class tea room, but a quite common tablecloth perfectly clean is

The Crockery.

Dirty Tablecovers.

infinitely better than the finest material with stains of one kind and another over it. Even quite plain people do not like to eat meals in the vicinity of stains on the tablecloth made by other people. It is not always convenient in the rush of business to change tablecloths, and the usual thing is to spread a serviette over any accidental stains made by a customer; but it is better, and not more expensive, to keep special cloths for the purpose, that seem as if placed on the table for ornament rather than to hide blemishes. The rule in all tea rooms is to have waitresses, and

Civil Waitresses.

the kind of waitresses secured has a very great influence in determining the success or failure of the business. It is entirely doubtful how far familiarity of the waitresses with customers tends to good business. Familiarity is prone to develop very quickly into giggling and "larking", and whenever this becomes prevalent in a tea room staid and quiet people, who in most cases constitute the majority of customers, are turned away, as they find that they are hardly treated with attention when the customers of the other sort, who may be much less profitable, are present.

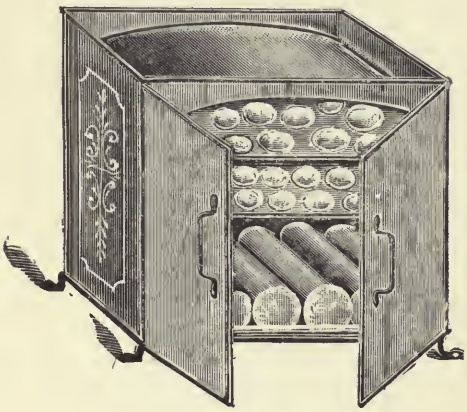


Fig. 169.—Jacketed Butter-cooler

It is still a vexed question how far the system of tipping should be allowed to go in tea rooms. Several of the large London restaurants ask customers not to give gratuities to waitresses, but these notices

Tipping System.

have by no means stopped the practice, and the fault probably lies more with the customers than with the proprietors of the establishments or the waitresses. All things considered, it is much better for the success of a tea room that tipping should be entirely discouraged,

Payment by Returns.

yet it seems necessary to have some system of paying by results, to ensure that the attendants feel, and therefore show that they are pleased to serve customers. The method generally adopted is to pay a definite commission on the amount taken at each waitress's tables. This system is an incentive to the waitress to be solicitous that the customer has as much as possible, and the customer, in turn, is pleased with the attention bestowed to that end. It is much better to give the waitresses a direct interest in the business by some such method than to regulate all their actions by rule. There can be such a thing as over-regulation.

Equally important with the cleanliness and efficiency of service is the quality of the refreshments supplied. Although tea rooms are intended for eating as well as for liquid refreshment, it is on the latter that the reputation of an establishment very often depends. Even men are par-

ticular about the quality of tea or coffee they drink, and will patronize the shop at which their taste is best suited. Bread should always be nicely cut, and butter, even in summer, should always be firm.

One of the constant troubles in a tea room is to secure regularity, and this is impossible when waitresses are allowed to spoon out of the teacaddy to the teapot, while it is troublesome to have portions for each teapot ready weighed or measured into small packets. In the hurry of business it is a common mistake, when the latter plan is followed, for the attendant to use a packet prepared for one person in a teapot intended for two, with the result that the tea is very weak. The customer thus treated may make no complaint at the moment, but will shun that shop in the future, while the attendant who committed the mistake may be quite unconscious of any fault. If tea must be measured at the moment it is wanted, small measures should be kept for the purpose for one or two or more persons; or measures for one and two may suffice, to be filled more than once if the number to one teapot is more. An ingenious tea-measuring machine (fig. 170) can be obtained for fixing on the counter, which delivers quantities of tea directly into the teapot, accurately measured for the number of persons. This machine is accurate in its measurements, thus ensuring uniformity of strength to customers, and also effecting a considerable saving in tea; but not the least important of the uses of the machine is the record it keeps of the number of pots of tea actually supplied. It can be accurately adjusted to deliver a definite quantity of tea into the teapot; then it cannot be tampered with or changed, except by someone in authority.

Uniformity of Quality.

Fig. 170—Tea-measuring Machine

It is not usual in high-class tea rooms to keep tea made in bulk and to sell it out in cups, but we cannot all be high-class caterers, and in working-class neighbourhoods, or in the vicinity of factories, there is profit to be made out of the trade in tea in pints and half-pints, or in cups. For this purpose a strong, large urn is required. An illustration of a cheap urn of this kind is here given (fig. 171). The tea is enclosed in a muslin bag and placed in the water at boiling temperature until it is sufficiently "drawn". The bag is then taken out, and the tea is kept warm, without deterioration, as long as required, by the boiling water in the outer portion of the urn. A better plan is to make the tea in a separate "brew-pot" and only keep it warm in the urn. Tea or hot water can be drawn off as required by the taps provided.

Coffee-house Tea.

Fig. 171—Cheap Tea Urn

A more showy and more efficient apparatus (fig. 172) has a special lining of earthenware, A, with an outer jacket containing the hot water. The dome shape at the top is an arrangement by which the condensed steam is carried into the outer water jacket, and not into the earthenware lining with the tea. The sloping bottom of the inner lining, as shown in the illustration, allows the whole of the contents to be drawn off without tilting the urn, so that the following brew is not contaminated by mixture with stale tea or coffee, as in the case of urns fitted with flat-bottom inner linings.

A more elaborate piece of apparatus (fig. 173) contains two patent sloping-bottom earthenware jars, a jug for hot milk, and a water-boiler, and in centre is a small hot closet or pastry-warmer, with a drop-down door. A combination apparatus of this kind is extremely useful for the confectioner who serves teas and coffees with hot pies or pastries, and who has not room in his shop or on the counter for separate urns and warmers for each purpose. With this, coffee and tea can both be made, and kept hot as long as necessary, and hot milk and pastries supplied with the minimum of trouble and at a very small cost for heat. In these cutting times all economies of this sort have to be studied.

Combination Appliance.

In all the counter urns already noticed the coffee is, as a rule, made by boiling in what is called the ordinary way, but lovers of coffee prefer to

SCHEME FOR HIGH-CLASS LUNCHEON AND DINING ROOM

have it made on what is called the percolating system, or by some method of distillation by which the full natural flavour of the coffee is preserved. An ornate combination urn, which the patentees have named the "Criterion", can be obtained, which produces excellent coffee and tea and hot water. It is claimed for this machine that one brew of coffee after another can be obtained without waiting, and that it is impossible to draw water from the machine unless it is boiling, so that all the conditions are present for properly infusing the tea. The percolating

Good Coffee.

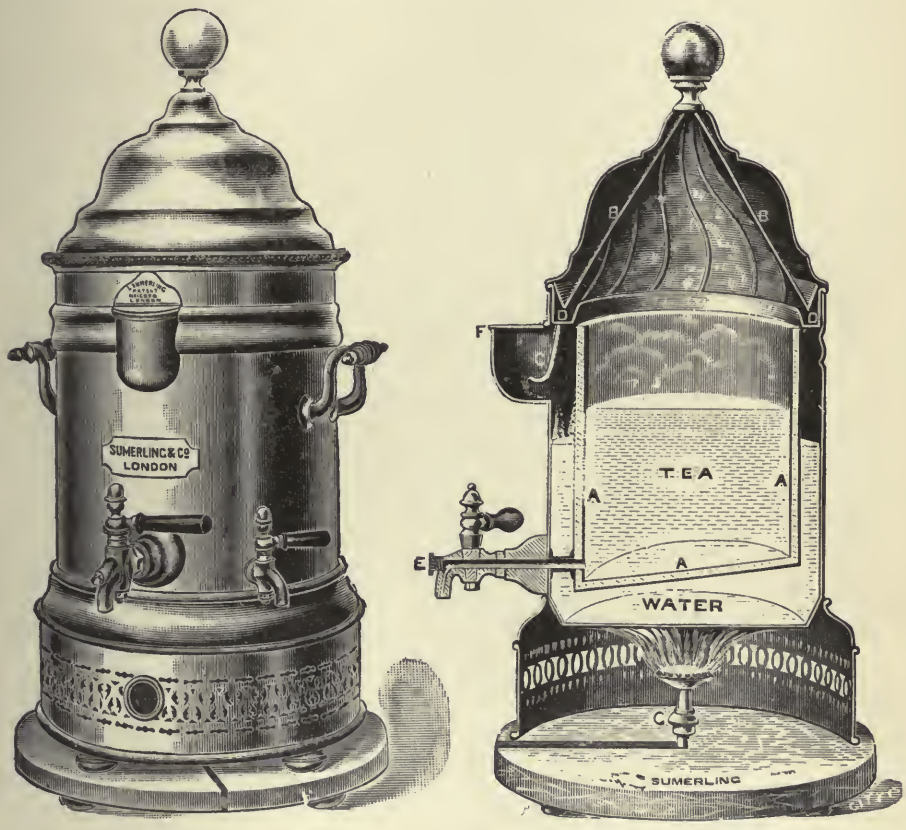


Fig. 172.—Superior Tea Urn: General View and Section

box which contains the ground coffee, through which the boiling water is forced and extracts the crude essence, is shown at the left-hand side of the illustration (fig. 174). The water supply is regulated by a head valve from the water main; the gas supply is regulated automatically so as to rise or fall as required to keep the apparatus up to boiling pitch.

Caterers are now paying much more attention to the manufacture of coffee than they did a dozen or so years ago. The essence-of-coffee bottle was at one time the common resort, and although the coffee made from such a source was better

Siphons for Coffee without Grounds.

than the product of the stewed grains made from burnt beans, it was not satisfactory. Something like continental care is now taken with coffee manufacture. In some of the leading refreshment establishments what are called siphon coffee machines are used. The illustrations of single and double machines of this type here shown (figs. 175 and 176) will make the working of the apparatus quite clear. Each ball has a capacity of about 1 gal. The ground coffee is placed in the long jar, and the quantity required of boiling water poured over it. About half a cupful of hot water is at the same time poured into

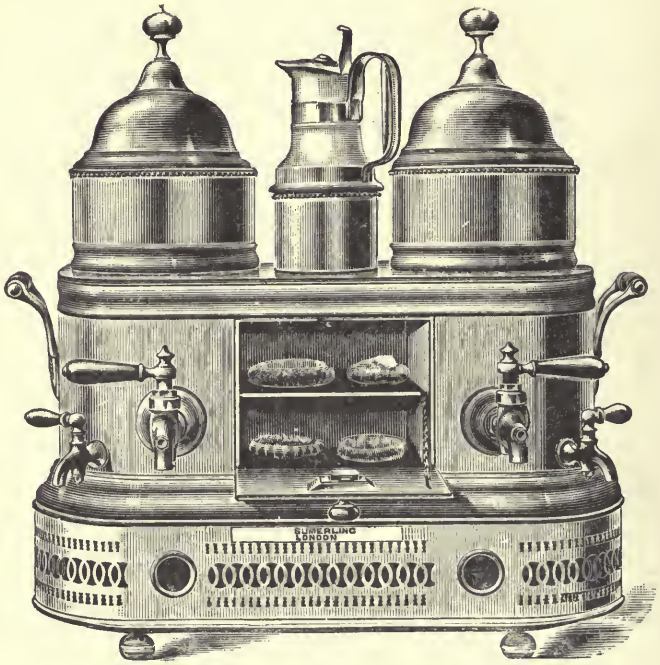


Fig. 173.—The Confectioner's Patent Double Urn.

the metal ball. The siphon is then fitted tight into the ball, the perforated end being allowed to rest on the bottom of the jar. When all the water in the ball is driven over into the jar as steam the bubbling noise in the jar will cease, the gas under the bottle is then extinguished, and a vacuum being created in the ball the infusion of coffee passes over through the siphon. No coffee grounds pass with it, and it can be kept hot and in perfect condition with a very small flame. The contents of the ball, which is pivoted on two stout pillars, can be poured into cups as required by simply tipping the ball forward.

Percolating Coffee Machines.

Another type of coffee-making machine (fig. 177) is now in use in many large establishments and gives complete satisfaction. This machine works on the principle of a percolator. The water is poured first into the bottom vessel, and the ground coffee into

the top one. There is an atmospheric burner under the bottom vessel. As soon as the water boils, which will be seen when steam blows off at the relief tap, that tap is turned off and the pressure of the steam forces the water into the top vessel amongst the coffee. This is allowed to brew for some time, and when sufficient the gas is turned out and the relief tap opened, then the coffee infusion will return to the lower vessel and may be drawn off as required in the usual way. A small jet of gas can

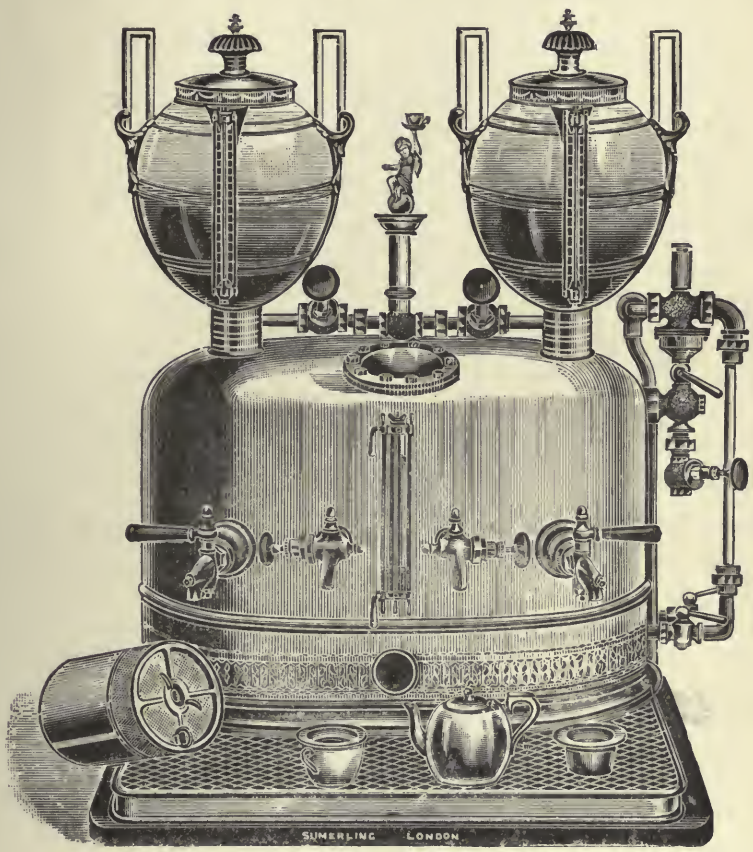


Fig. 174.—"Criterion" Coffee and Tea Urn

be lighted to keep the coffee infusion hot. When either of the last two types of machines are in use for coffee-making, it is necessary to have a small hotplate on which to keep the small coffee-pots, if it is served in these, and the milk jugs with milk quite hot, or all the care in coffee-making will be wasted if it is served in cold coffee-pots or with half-warmed milk. If the top of a suitable urn is not available for the purpose a small counter hotplate as shown in fig. 178 serves the purpose well, and a few small plated coffee-pots and milk jugs on a plate of this kind gives the shop or tea room quite a smart and cosy

Counter Hotplate.

appearance. Or, if there is a trade in pots of tea, an oval water-boiler with a flat top as shown in fig. 179 is a suitable arrangement for keeping milk hot and heating tea, coffee, and chocolate pots. For the usual supply of hot water where only a moderate trade is done, this form of water-boiler is quite efficient and gives the shop a nice appearance.

Water-boiler and Hotplate.

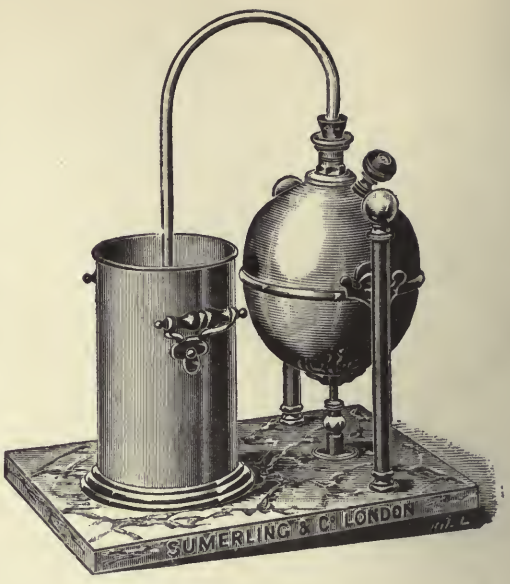


Fig. 175.—Siphon Coffee Machine

To meet the needs of larger trades an ingenious piece of apparatus (fig. 180) is in the market which is a combination of a water-boiler, coffee-infuser, and milk-warmer. The centre body is a water-boiler of 6 gal. capacity, fitted with a gauge glass to indicate the quantity of water in boiler. The water cannot be drawn off

Combined Appliances.

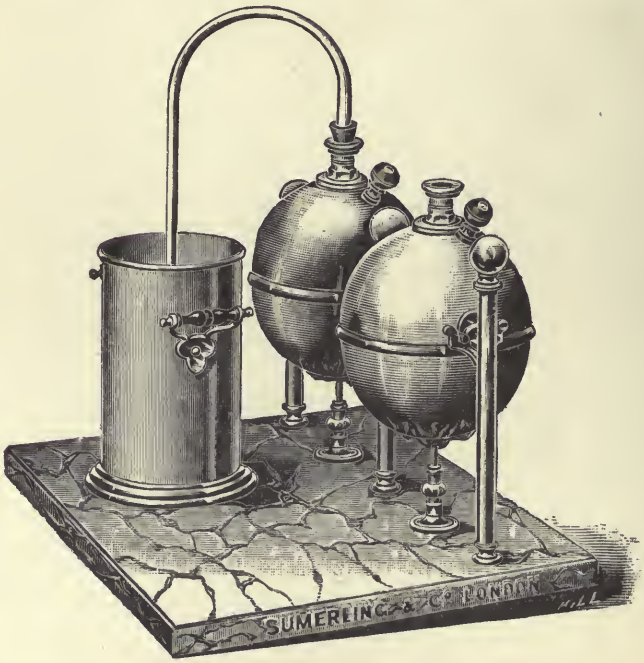


Fig. 176.—Double Siphon Coffee Machine

unless it boils. Coffee is infused in a silver-plated infuser placed in one of the side urns, by means of the delivery tube on top of boiler. The other side urn is intended for hot milk or chocolate, and both jars are fitted with sloping bottom linings. A smaller and cheaper arrangement for the same purpose of supplying water, coffee, chocolate, and hot milk is shown

Fig. 178.—Counter Hotplate

Fig. 177.—Coffee-infusing Machine

Fig. 179.—Oval Water-boiler

in fig. 181. The jugs, as shown, have a capacity of about 3 pt. each. The sloping bottom jar in centre for coffee holds 1 gal. The body holds about 3½ gal. of water for making pots of tea, &c. This type of urn has a homely and comfortable appearance about it that makes it very suitable for, say, a confectioner's shop in which the refreshment business consists only of teas, coffees, &c.

In refreshment bars, coffee and tea rooms, and other establishments where a quick and large supply of boiling water is needed, the counter hot-

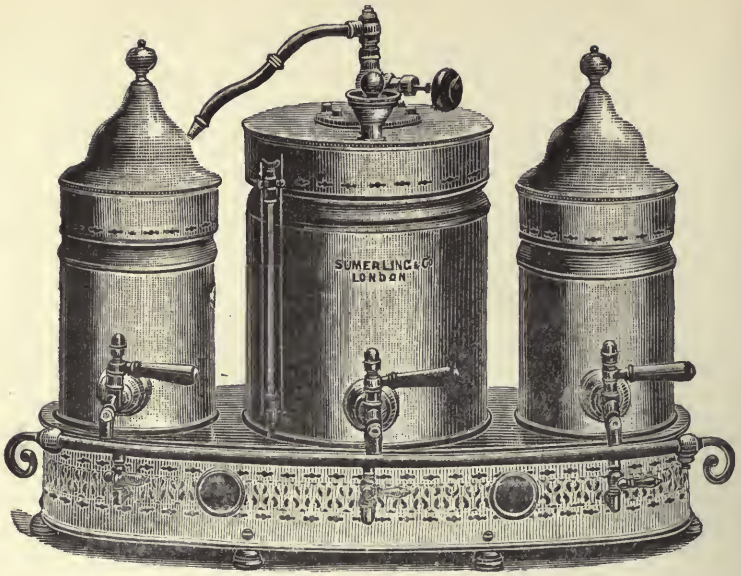


Fig. 180.—Water-boiler, Coffee-infuser, and Milk-warmer combined

water fountain, an illustration of which is here shown (fig. 182), is a very efficient appliance, and has the advantage of taking up very little room on the counter, while the boiling water can be drawn off, at least for all ordinary purposes of supplying pots of tea, as

Boiling-water Pillar.

Fig. 181.—Combination Water-boiler, Coffee and Milk Warmer

INTERIOR OF THE DUTCH KITCHEN RESTAURANT, CARDIFF

quickly as a staff of waitresses can carry them away. In this illustration there are two pipes shown, one to carry off the gas fumes, and the other to supply boiling water. The pillars are polished and nickel-plated, and in consequence have a bright and ornamental appearance standing up from the

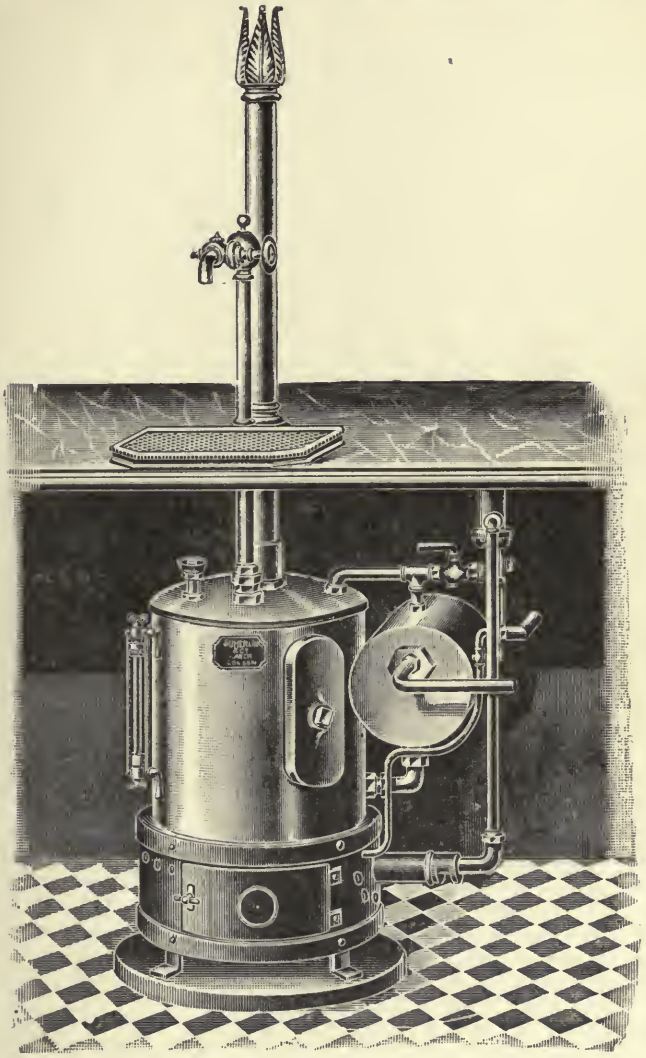


Fig. 182.—Fountain Hot-water Pillar

counter. The water supply to the boiler underneath is automatic, and the gas is also automatically regulated so that no more is used than necessary to keep the water boiling. This sort of fountain is being extensively adopted in the refreshment bars of railway stations, and other places where the hot-water requirements are intermittent but needed in considerable quantity for short periods.

A more elaborate fountain of the same type as that described above is shown in fig. 183. This combined appliance, besides the boiling-water pillar, has a twin coffee-extractor, a hot-milk urn, and an egg-steamer. The whole

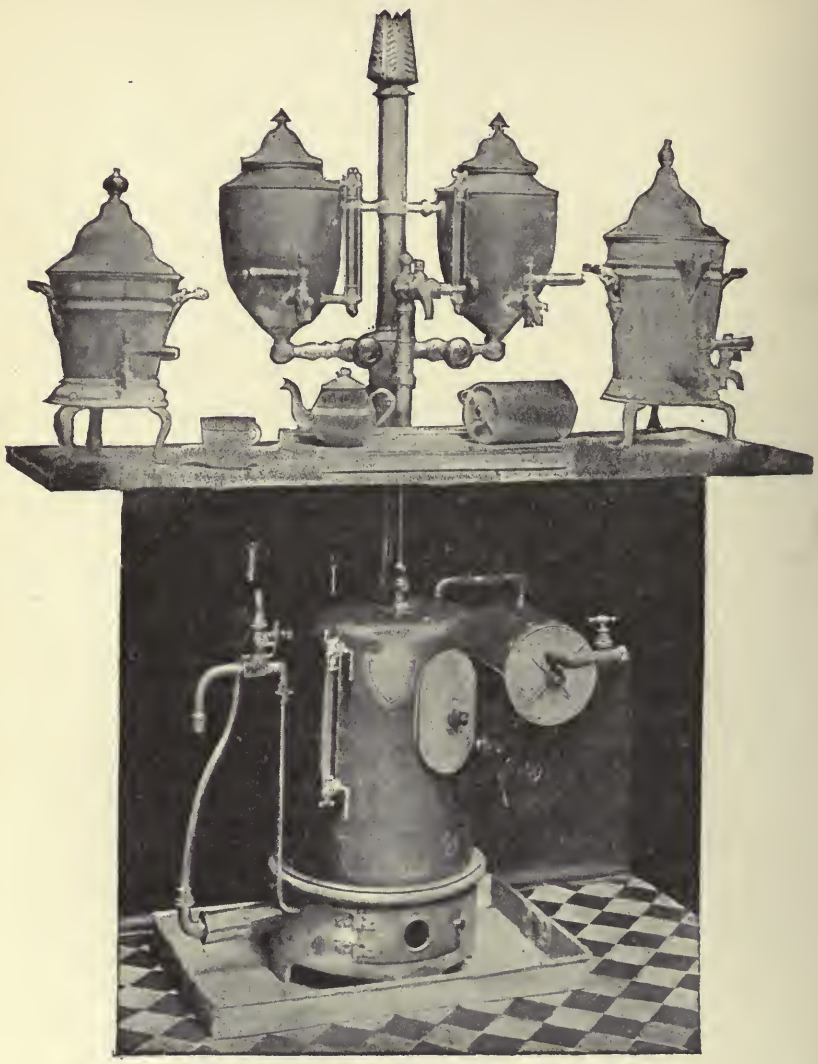


Fig. 183.—Water Pillar, Coffee-extractor, Milk Urn, and Egg-steamer

Steam Counter Combination.

is worked by the steam from the boiler underneath the counter, and by one gas burner which is raised or lowered automatically. The water supply to the boiler is also automatic, but cannot be drawn off till boiling. The coffee is made by placing the required amount of coffee in the percolating box in the vessel, and then turning the boiling-water tap on till sufficient coffee is extracted, the quantity being shown on

the gauge glass. By repeating this operation with the second vessel a continuous supply of coffee can be maintained.

From the illustrations here given and the description of appliances the extent to which this light-refreshment business has developed within recent years can to some extent be gauged. When carefully managed, and the neighbourhood is suitable, this form of catering can be made very profitable; but it is one of the conditions of success that the trade catered for is nicely adjusted to the character of

Profits in Poor Districts.

Fig. 184.—Form of Water-boiler with Coffee and Milk Jars on top

the neighbourhood. In poor or in working-class districts there is money to be made with refreshments if the class of goods sold and the price is adjusted to the wants of the customers; but even in places of this kind it is the wisest economy to have all the appliances, down to the salts and mustards, as nice as possible, even if plain, and counter appliances cannot be too bright or too smart looking.

As part of the menu in working and middle class neighbourhoods, especially for midday and evening sales, consists of hot puddings, pies or pastries, while little other cooking is done, two forms are here shown of

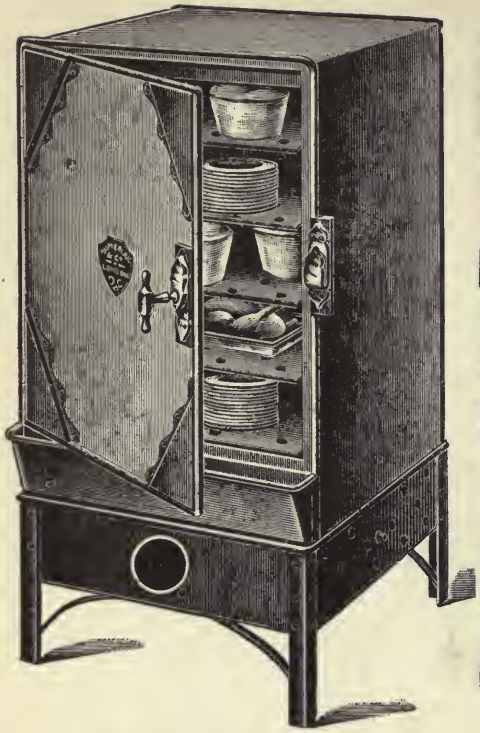


Fig. 185.—Steam Cooker, No. 1

Fig. 186.—Steam Cooker, No. 2

Self-steaming Cookers. self-generating steam cookers to be used with gas (figs. 185 and 186). No. 1 is a comparatively light cheap appliance, and can be used with gas stand, range, or gas stove. The steam is gene-

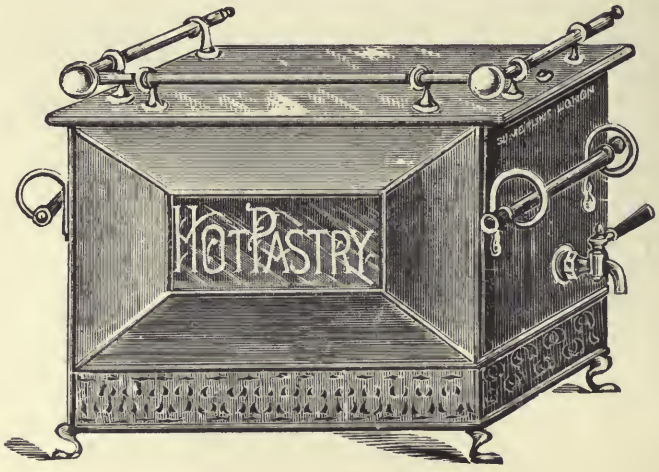


Fig. 187.—Counter Pie-warmer

rated in the bottom of the closet, and a passage is provided on the inner side of the door by which the condensed steam which runs down the door is conveyed back into the water well, thus preventing the waste and annoyance caused by the water running down outside. The same appliance is also made as a jacketed food and plate warmer, so that the generated steam is conveyed in such a way that the whole body and shelves are made very hot, but without allowing any steam to come into contact with the contents. No. 2 is a stronger and more expensive appliance. It is fitted with a copper steam generator, and is jacketed. The hot air from the gas burner is conducted through the jacket and out of the flue at the top. This keeps the cooker very hot, and makes the oven at the top very suitable as a plate-warmer, or for heating pies, &c. When a small hot closet for counter use only is required, for hot pies, pastry, &c., something ornamental should be provided. Fig. 187 shows an appliance of this kind. While the inside can be used for the purposes named the top serves as a teapot-heater, or for keeping milk, coffee, or chocolate warm.

Jacketed Pie-warmer.

Counter Pastry-warmer and Hotplate.

CHAPTER XLIX

BAKERY OVENS

Having now dealt exhaustively with the part of the scheme relating to restaurants and catering, we may take up the threads of the story of the bakery so far as concerned with its fixtures and fittings and with equipment of machinery, &c.

When one opens a new bakery or takes over an old one there is no part of the fixtures to which more attention should be paid than the ovens. The youth anxious to make a start on his own account somehow, is prone to think that any kind of oven will do *for a start*, and is not particular enough as to his requirements in his agreement with the landlord; or if he pays for the oven himself chooses one that is cheap to construct without satisfying himself that it is also efficient and economical to heat and use. When an oven is gluttonous for fuel and loses heat quickly on account of bad construction, the accumulating yet unseen waste from these sources may really make what would otherwise be a profitable business into one in which ends do not meet.

Importance of Good Ovens.

The essentials in an oven are that it should be an efficient baker in which top and bottom heat should always bear a steady relation to each other, and yet one in which it is possible to produce top or flash heat at will; after being solidly heated it should be so constructed as not to lose heat except in performing the work for which it has been designed; it should be easy to heat with only a moderate

Essentials of a Good Oven.

quantity of fuel. That an oven should be clean may be considered as an extra essential—not because cleanness in itself is not wholly desirable, but because it is quite possible to have an oven that in ordinary circumstances may appear not clean, and yet by care and systematic cleaning can be made to satisfy the most exacting in the clean and efficient manner in which it can be made to bake all that is required, while on the other hand there are ovens in which every care has been taken to ensure cleanliness and yet out of which goods may be produced in a dirty condition. It is noticeable that when everything has been done to prevent dirt or dust in the oven, the bakers may readily take much less care to remove that which does accumulate than in the other case where the removal of dust, &c., is so necessary a part of the routine work before any baking whatever can be done. This is the explanation of the fact that the cleanness of the goods from such types of ovens as the Scotch or the side-flue compares very favourably with the goods from the steam-pipe and other types of externally heated ovens.

Value of Appearance.

The bright exterior and ornamental fittings of an oven, desirable as these may be, are also to be classed as extras. They give an air of brightness and lightness to a bakery that are not without effect on the men, who may on account of their surroundings become brighter and go about their work in a better and more active spirit, which is a factor in the production of good work. But embellishments do not add to the efficiency of an oven, while they may add very materially to its cost. Yet when the substantiality of the structure is assured, and the furnace, wherever it is situated, is made of material that will withstand the enormous heat to which it will be subjected, when the doors are proved to be tight and properly fitted, then there are some kinds of ornamentation that should always be preferred even if they do add slightly to the cost. Thus all the bright work about oven doors, and wheels and rods to work doors of drawplates, should be plated instead of being merely polished. The plating detracts nothing from their strength, lasts about as long as the fittings, and prevents constant rusting by the steam from the oven. Whenever possible the front wall of an oven should be of glazed brick with one or two rows of coloured bricks as relief from the pure white.

The Best Oven.

Those about to build ovens are always anxious to know which is the "best oven", and nearly every oven-builder is prepared to vouch that his is the best. It is surprising what results can be secured with care out of the oldest and oldest-fashioned ovens. But as there has been a constant change in the manner of heating ovens, although not necessarily in the ovens themselves, there was evidently a demand for the changes, and they have had a marketable value, although not all the changes have really been improvements.

Simplest Kind of Oven.

The very simplest kind of oven, examples of which are still in daily use in our own and in many other countries, consists of a single brick or stone structure with no opening whatever

into it except the oven door. That door may be a simple iron plate without hinges but with two handles. The chimney, which is generally a wide aperture, is above the oven stock, and has no direct communication with the oven chamber, or indeed with the fire the gaseous products of which it is required to carry away, except the same aperture that serves for the oven door. Fig. 188 shows a section of such an oven and indicates roughly the manner of heating. Some forty years ago ovens of this type were almost universal in country towns in Scotland, in Ireland, and generally in the south of England. In Ireland the fuel burned was peat, a heap of which was set alight in the centre or at one side of the oven, on the bottom without any furnace bars; when this was partly burned down the remains of the fire were scattered over the whole oven bottom, and left till the embers burned out.

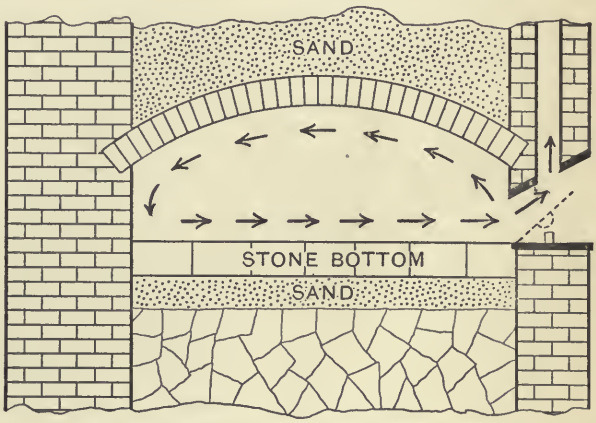


Fig. 188.—Section of Old-type Oven for Peat or Wood

In the English type of ovens of this class the fuel burned was mostly wood. Faggots were set alight in one side of the oven or in several places at the same time, but always on the oven bottom, and these with additions were allowed to burn till the whole oven was sufficiently heated. The air supply, to burn the peat or wood as the case might be, entered by the oven door, and the products of combustion found a passage to the chimney through the upper part of the same door. The English and Irish types of this class of oven had a flue, opening directly into the oven, long before the same arrangements were adopted in connection with the Scotch type. The burning of the fuel in the former type was conducted with closed door and open damper.

Old Scotch Ovens.

The Scotch ovens of the old type, which will be vividly remembered by some of the older men still actively engaged in the trade, were mostly built of stone, except perhaps the crown. The stone bottom or sole was about 6 or 8 in. thick, generally laid on a bed of sand solidly filled underneath with stones or gravel. The door, generally referred to as the "back", was set in position when the oven was being heated in the manner shown in the section (fig. 188) by the dotted line, the sloping position being maintained by a brick placed under the handles. In this case as coal was the commoner fuel, especially in the districts where coal was comparatively plentiful, a form of grating had to be used so that the draught might get fairly under the fire. Fig. 189 represents such a grating. This was cast all in one piece, and stood on three short feet about 2 in.

high. It was pushed into the corner of the oven by using an iron hook on a wooden handle. There was an iron fender (fig. 190) placed in position around it to keep the great heap of coal which formed the night's fire in position on the "chaffer bottom". The procedure in heating the oven was to pile on about a hundredweight of coal—ordinary soft kind—on a fire already made with wood at night after the day's work was done, and to set the "back" on the slope so that there was an opening about 3 in. wide at the top. This arrangement kept the coal burning very slowly for twelve or thirteen hours, the oven chamber for the first part of the time being filled with thick smoke and a dull red flame, but afterwards with a moderately bright fire, really of coke, after all the gaseous matter had been driven out of the coal and burned. The radiation from this fire, continued as it was for several hours, was sufficient, along with the hot currents of heated products from it, to heat the oven interior thoroughly.

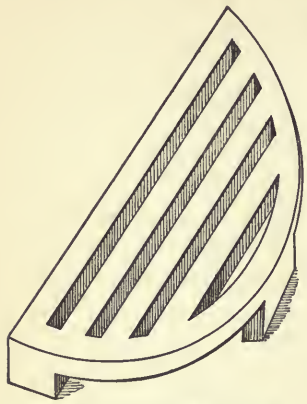


Fig. 189.—Corner Chaffer for Coal-fired Scotch Oven

Management of the Old Scotch Oven.

The first work in the morning was to draw the greater part of the remaining fire from the oven, leaving sufficient to retain a strong top heat for the baking of morning goods and sufficient to light the clumps of wood that were thrown on when the top heat required to be augmented. The heat in ovens of this type was necessarily "solid", because the whole structure of the oven was solid and was heated in all its material to a high degree of intensity. The sole or bottom of the oven, made of thick stone, retained its heat for the whole day's baking; the crown, which at its centre was never less than 3 ft. from the sole, was also well heated, and on account of a thick layer of soot which always covered it the heat was radiated slowly, and the solid brick thus retained its heat for a long time. It was part of the ordinary routine work of the bakery to remove the soot from the oven crown with a long rough brush at least three times a week, and the combustion of coal was so incomplete that pendants of soot $1\frac{1}{2}$ or 2 in. long completely covered the back of the oven crown. When the batch was about to be set the fire was completely drawn from the oven, so that the bread was baked in a heated and rather dirty stone pot. With such an oven the greatest skill and care were needed on the part of the workmen to ensure cleanness of the goods baked, and as customers would not take them otherwise the use of those old ovens served as an excellent training of

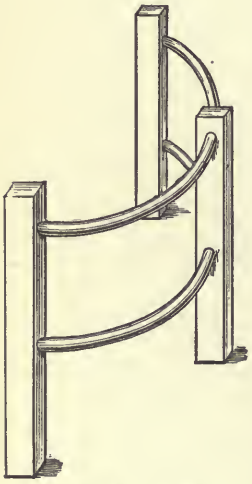


Fig. 190.—Fender

careful workmen, and dirty and troublesome as they were some old-school bakers were loth to part with them even when something better was offered. It is doubtful if there are any of those old ovens still in use in Scotland, but in Holland ovens of similar type in which the fuel is peat are in use for baking rye bread.

Fig. 191.—Oven Blower

The oven types were ultimately changed, but strangely enough the method of change was different in the three countries named. Thus in some parts of England, notably in Lancashire, the older pot type was altered into the form still much in use in the county, which is designated "the wagon oven". To convert a pot oven as described into a wagon oven it was only necessary to enclose the chimney with an iron box, around the bottom of which another movable iron box called a blower, with handles, could be fitted, with an opening through it for a large pipe. Fig. 191 shows such a box. The small hole in the upper part is intended as a peephole to ascertain the condition of the fire. This box and the other fittings are from photographs taken quite recently, all the appliances shown being still in actual use. The wagon or movable chaffer consists of an ashbox and a firebox (fig. 192). The ashbox has two flanges at one end into which a long iron pipe is fitted, this pipe passing through the opening already alluded to in the box forming the oven door. The firebox fits on top of the ashbox, and as its name indicates contains the fire (fig. 193). The long pipe passing through the hole in the door conveys the air for the combustion of the coal through the ashbox, and up through the fire the products of combustion pass along the roof back to the box at the door and up the chimney

The Wagon Oven.

Ash Box Hopper or Fire Box

Fig. 192

The strength of the draught can be regulated by a damper fixed at the bottom of the chimney. As the fire burns, the position of the wagon in the oven is altered, one of the lengths of pipe being removed as the wagon is pulled down nearer the front of the oven; or if the firing is started near the front, the second length of pipe can be added as the wagon is pushed towards the back of the oven. This type of oven is a great improvement on the original pot oven. The crown can be burned clear and free from soot owing to the strong draught produced through the pipe. Then the intensity of the heat of the crown is greater than in the old form, and a flash heat can be produced readily, time being allowed by burning another fire. The persistency of this type of oven in some parts of Lancashire, where it has been common for about ninety years, is testimony to its

Fig. 193.—Wagon ready for Lighting, showing Draught Pipe

possession of many good points, although it is undoubtedly both troublesome and dirty.

Modern Scotch Oven.

The change from the old pot oven to a variety of the blast type was of much more recent date in Scotland, and the change took a different form. The first alterations required no great structural changes in the oven itself, except that the chaffer and fender were discarded, and in their place a cast-iron set of furnace bars, all in one piece, were fixed, generally in a large block of firebrick, in one corner of the oven. The set of firebars are about 16 in. long by 10 or 12 in. wide. Fig. 194 shows their position in the oven bottom. An ashpit with door was cut through the wall under the furnace bars. The fuel was changed from soft coal to gas coke or anthracite coal. To keep the fuel on the bars a broad piece of iron bent at right angles formed a fender. The old chimney was, in the first instance, continued in use, but, as in the case of the wagon oven, it was reduced in size by boxing in with sheet iron; then a box exactly like that shown in fig. 192, but without the large pipe-hole, was placed over the oven mouth, and really formed the opening to the flue or chimney. The air to supply the fire entered by the ashpit door. The products of combustion pass across the roof to the back wall, are then forced to descend there, and they return across the oven at the level of the top of the oven door, and pass through the box up the chimney. This arrangement ensured a very considerable draught, and as sufficient air could be admitted to burn the fuel properly, the crown of the oven would

be quite clean and bright, and more intensely heated than was possible with the older type, the absence of smoke from the fuel also contributing to the same end. But the iron box or "blower" was merely a temporary expedient, and was soon superseded by an arrangement exactly similar to

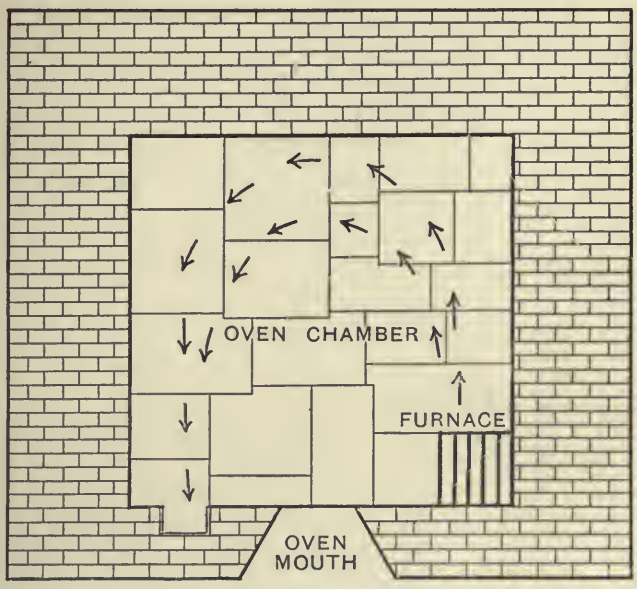


Fig. 194.—Plan of Modern Scotch Oven

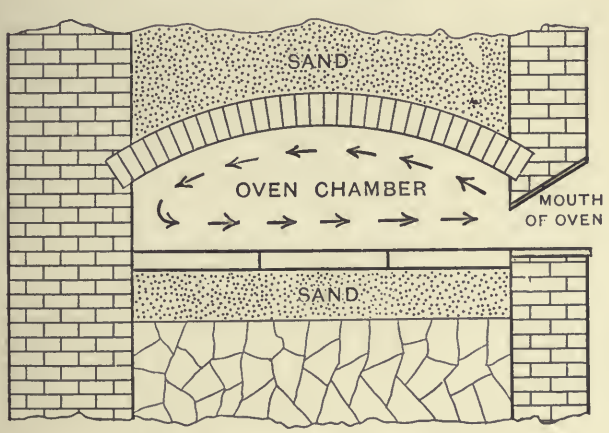


Fig. 195.—Section of Modern Scotch Oven

that still in use in the modern Scotch oven. A proper flue is built in the front wall of the oven in a position opposite to the side in which the furnace is placed (fig. 194), and this is controlled by a damper exactly in the same way as a side-flue oven. When the oven door, which is now usually swung on hinges in the orthodox way, is shut, and the ashpit door is open, the coke fire soon burns to a white heat, and the crown and walls can be

heated to high intensity when necessary for "flash" purposes. But the Scotch oven is still essentially a solid structure, and on account of the close-packed bread baked in it its heat must also be solid; that is, it must not be so much a surface heat as a sort of heat reservoir in which a great *quantity* of heat is stored. To ensure this the heating process has to be done slowly. The usual practice is to pile on a considerable quantity of coke on the top of a small, bright fire after the usual work of the day is done, and by leaving the ashpit door a very little open, and the damper also open about an inch, to keep this fire burning very slowly all night or all day, as the case may be. With the heat generated in producing the first bright fire by blowing, this slow combustion of the coke has been sufficient to saturate—if the word may be used in this sense—the crown, walls, and sole with a large *quantity* of heat. At the beginning of the day's work the fire will be still alight, but the greater part of the fuel burned away; a clinker consisting of the incombustible mineral matter of the fuel congealed together will be formed on the bars. This clinker is first removed, the live part of the fire raked together and freed from dust through the ashpit, then a few shovelfuls of coke are thrown on, and the fire allowed to blow for about twenty minutes for the purpose of giving the intense surface heat needed; then the oven is ready for the day's work. If a batch of bread is the first thing to be baked in the oven, it may be necessary to allow it to "lie down" a little before setting of bread commences, so that the intense surface heat may penetrate into the solid material of the oven.

Management of the Scotch Oven.

The modern Scotch oven is still a very high-roofed structure, about 2 ft. 10 in. in the centre of the crown being the usual height. Amongst its virtues may be mentioned the capacity it has for absorbing and retaining heat. The heat-retaining properties of the oven crown are much assisted by its formation. Reference to fig. 195 will show that the spring of the arch is some distance above the top of the oven door, so that even if the oven door is open, the highest heated air in contact with the oven crown will not descend to the height of the top of the door to fly out. The part of the oven above the level of the door, therefore, forms a kind of closed box of more or less stagnant but extremely hot air, which protects the crown from access of cold air without hindering radiation. Some oven-builders intensify this effect by keeping the top of the oven flue, through which the products of combustion emerge when the fire is burning, about the same height as the top of the oven door, so that these products have to descend a little before they reach the level of the exit. This arrangement, while it slightly reduces the draught, is one making for economy. The hot products, on which the heat of the oven partly depends, have more time to be absorbed, and the level of the crown being above the level of the exit, these products are likely to pass up the chimney at a lower temperature than in the case where the opening to the flue is nearly continuous with the crown. The slight reduction in draught is due to the partial obstruction which the part

Heat Capacity of the Scotch Oven.

of the wall above the flue presents to the highly heated currents from the fire as they rush along the roof of the oven to the flue, but partly also to the reduced temperature of these currents when they do pass up the chimney. Figs. 194 and 195 show the direction of the products of combustion in an oven of this class. On account of the height of the crown it is possible to keep a small coke fire burning very gently even while the bread is baking. Active combustion is not allowed during that time, but the fire is kept alight, and as a rule some damp coke is thrown on it before setting commences, and the ashpit door kept closed, so that not more air is allowed than enters, virtually, above the fire, by the oven door. This arrangement keeps the fire burning without producing any appreciable quantity of fumes. The purpose is to allow a flash heat to be given the oven between batches if necessary; or it is not uncommon to allow the oven to "blow" for some time, that is, to allow the fire to brighten up while, say, the last batch is in the oven, if it is desired to secure a better colour and bloom on the top crust than the oven in its comparatively cold state would give. This plan is quite safe in an oven with such a high crown, and in which the opening to the flue is considerably above the top of the baking bread, for the products of combustion with such an arrangement need not reach the top of the loaves, the bloom and colour on the latter being really obtained by radiant heat from the newly and intensely heated crown. Those who fear to lose the steam in an oven while bread is baking will regard the method of obtaining bloom just described as very strange, but if it is considered that the expedient is only adopted in a case when the oven is very cold, and therefore in circumstances under which the bread has probably not lost the normal quantity of moisture, and when it is remembered also that the reduction of moisture in a loaf to a definite extent is an essential condition of its being properly baked, the strangeness of the method disappears. The conditions under which Scotch loaves are baked also prevent undue drying, as the top crusts of the loaves are nearly continuous, and the crumb is but little exposed to excessive evaporation, even under the conditions mentioned. It is not possible to actually heat the crown of an internally heated oven while the bread is baking if the crown is low, as in the side-flue oven, yet, other things being equal, it is not a bad plan to complete the baking of a batch of bread in a perfectly dry heat—that is, in an atmosphere quite free from steam. Leaks in the oven structure or in the door fittings may prevent the atmosphere within the oven being quite steam-saturated, but when it is even nearly so the effect is to toughen the crust of the bread after it has cooled, whereas, if the last four or five minutes' baking takes place in a steam-free atmosphere, the crust is rendered crisp and retains this property.

The greater part of the heat in the sole of a Scotch oven is obtained by conduction directly from the fire, the heat passing through the stones from one particle to another outward from the furnace. On this account the stones around the furnace are much hotter than those away from it,

and the differences in this respect are so pronounced that more care is needed in baking small goods in this type of oven than in any other, to ensure anything like regularity; the systematic turning of baking sheets while the goods are baking is a necessity. The crown of the oven, like that of other types of internally heated ovens, secures its heat by convection currents of heated products or by flame from the fire, while the surface heat of the sole is in part obtained by radiation from the crown after that is heated. This latter source of heat to the sole is, however, much less effective in the case of a Scotch oven than in a low-crowned side-flue oven, because of the much greater height of the crown of the former. It may be interesting to note here the effect that distance has on the value of radiant heat from any source. Stated in a scientific manner, it has been proved that radiant heat—or, as it is called, radiant energy—is modified in its effects *inversely as the square of the distance from the source of the heat.* The meaning of this in common language, as applied to the heating effects of the oven crown at the oven bottom, is that if two crowns were heated to exactly the same intensity, but one was twice as far from the oven bottom as the other, the value of the radiant heat from the higher crown in a given time would not, as one might ordinarily expect be half that of the low-crown one, but would be only one-quarter. Similarly, if one crown were three times the height of another, and both were heated to the same intensity, the radiant heat from the higher one in a given time would only be one-ninth that of the lower. It will thus be seen that to get the same baking capacity from a high-crown oven as from a low one, the former needs to be heated to a much greater degree. Yet, as already indicated, the high roof and other peculiarities of structure in the Scotch oven are conducive to heat-retention, which is one of the properties specially desirable in an oven used for closely packed bread that requires long baking.

Source of Heat in the Scotch Oven.

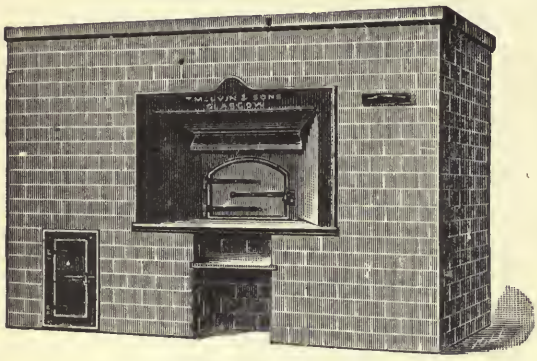


Fig. 196.—Scotch Oven Front

It is a curious fact that the very high-crowned Scotch oven is not well suited for baking the English type of loaf called a cottage; it makes them high, and in the case of many of the loaves nearly separates the tops from the bottoms. The baker generally gets over the difficulty of explaining this by saying that the high crown "draws" or pulls the tops off, but there is no reasonable explanation ever offered as to *why* this should happen, or by what means the "drawing" is effected. The probability is that the cause of the trouble

Cottage Loaves in a Scotch Oven.

is the extreme dryness of the atmosphere of the high-crown oven for a very considerable time after the loaves are set in it, owing to its large cubic capacity. The dry heat radiated from the crown causes a hard and inflexible crust to form very quickly after the loaves are set, much more quickly than would happen in an oven with the same heat in a moist atmosphere. The hard crust is formed before the interior crumb stops growing, and as the crust will not yield, the top is lifted from its position all in one piece. In an oven with a low crown, and therefore of much less cubic capacity, the steam from the baking bread very quickly, after the door is shut, fills the oven atmosphere with moisture to a degree at least to prevent the crust from becoming too rigid before the interior has stopped growing.

The general excellences of the Scotch type of oven consist in its great work capacity, small fuel requirements, and its longevity and low cost for repairs. Some of its defects, from a modern and universal point of view, have been pointed out, but its worst fault is the dust and dirt inseparable from its use. When the fuel has to be thrown on the fire through the same aperture as that through which the bread is set, and when ashes and fire have to be withdrawn through the same door, a great deal of dust is necessarily raised. To get over one difficulty, a firm of oven-builders have patented a set of firebars that can be tilted, so that when necessary the fire or ashes can be withdrawn through the ashpit door instead of in the usual way through the oven door. The writer has had some personal experience of this arrangement, and can vouch for its efficiency as an improvement. There have been ovens of the Scotch type erected with furnaces like those of the side-flue oven, situated in the oven front wall, but the difficulty attending the use of such furnaces is that the thick oven sole does not get heated to anything like the intensity required, because the wall furnace does not heat the sole in the same way, by conduction, as a furnace continuous with the sole, and in close contact with it on two sides; then the wall furnaces, as constructed, were not suitable for burning coke, and with that fuel the back of the oven could hardly be heated. There is no reason, however, why the furnace of a Scotch oven should not be readily fed with fuel through the front wall, by a special passage which could be properly closed, while the fire is burning, by a hinged fire block swung behind and above the fire. One peculiarity of the method of coke combustion in a Scotch oven will be referred to in the chapter on fuel.

Advantages and Disadvantages of the Scotch Oven.

In the south and midlands of England, and in Ireland and some parts of Scotland, the old pot ovens were succeeded by the type we now know as the "side-flue". The position of the furnace and flue and direction of the currents in this oven are shown in the plan, fig. 197, while the direction of the products of combustion when the fire is burning is shown in the section, fig. 198. The furnace is comparatively long and narrow, and is built in a slanting direction in the front wall. In some cases the roof of the furnace is sloped very slightly upwards so as to

Side-flue Ovens.

run continuous with the crown of the oven. Sometimes the furnace bars are quite level, but in other cases they are made to dip a little towards the interior of the oven. The top of the flue is usually continuous with the oven crown, and the flue opening is nearly as deep as the interior wall

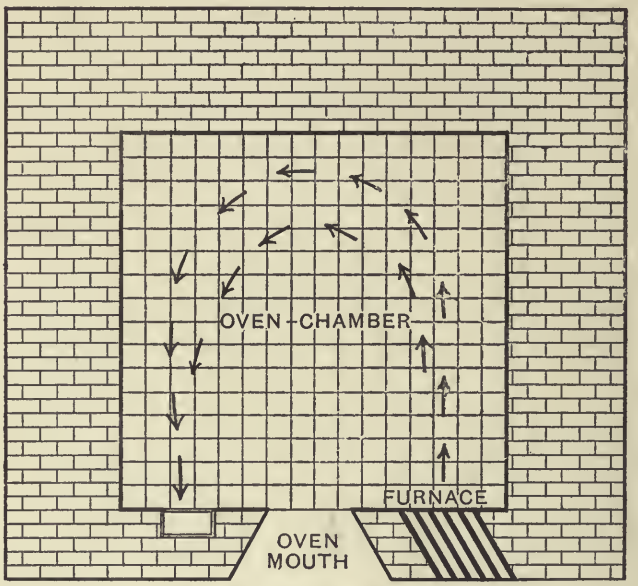


Fig. 197.—Plan of Side-flue Oven

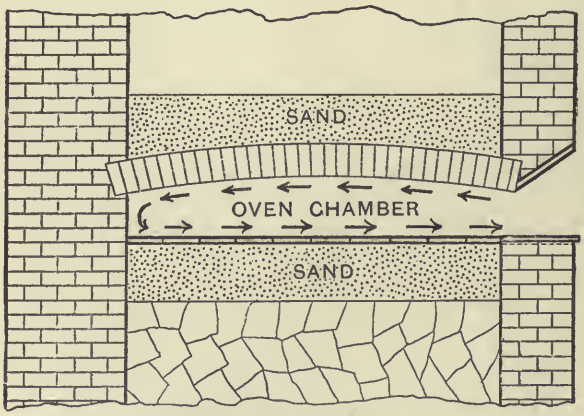


Fig. 198.—Section of Side-flue Oven

of the oven. The bottom of the flue opening is on occasions raised the thickness of a tile above the level of the oven bottom. The fuel almost universally used is coal, as a long flame is necessary to the effective heating of the oven. When the fire is burning, the oven door is shut and the flue, damper, and ashpit doors open. As the coal is freshly burning a long flame stretches from the furnace diagonally across the oven and spreads

itself out in fan-like form. As this flame is in closest contact with the roof the latter becomes intensely hot, and gradually becomes almost white, through all adhering matter being burned off, and on account of the intense heat of the brickwork. When the oven is all clean and white the firing is considered sufficient, and no more fuel is used. The whole process of heating an oven of this type for the day's work may not occupy more than from two to three hours, according to the kind and quantity of baking to be done. Economy of fuel depends very much on the ovensman. A careless or uninformed man may readily use a large amount of fuel without obtaining anything like the equivalent heat from it. The most wasteful custom is that of allowing the fire to burn into holes, or to burn very low before adding fresh fuel. When holes are allowed in the fire the inrush of cold air through these is greater than is needed by the burning fuel, or at least it does not combine with the fuel, but serves to reduce materially the temperature of the actual products of combustion; in some cases when the fire is "green" the heat may be actually below the ignition point of the gases produced, the result being that there is much smoke and little heat, the combustible gases passing up the chimney unconsumed. When the fire is allowed to burn too low before fresh fuel is added the cold air entering under the grate is likely to be greater than the fuel can combine with; the products of combustion are therefore seriously reduced in temperature, and may even be at a lower temperature than the hot brick surface of the oven on which they impinge; that surface is therefore cooled instead of being heated. Most bakers are familiar with this sort of thing, and speak of the oven "blowing cold". Alternate heating and cooling of the oven due to such causes as just described are extremely wasteful. There is another trouble that sometimes arises through inexperience or carelessness. The experienced ovensman when about to add a fresh charge of fuel is careful to first push part of the white-hot coke left from a former charge of coal, after all the gas has been driven out of it, well towards the head of the furnace, and to place the fresh charge behind it and nearer the door, taking care, however, to leave enough bright fire underneath to light the new fuel. As the gas is driven out of the new fuel it is ignited as it passes over the white-hot coke at the head of the furnace, and none of the gases are allowed to pass away unconsumed, while the longest and hottest flame possible is produced by this means. The inexperienced man may throw his fresh fuel to the back of the furnace, and in consequence much of its products may pass up the chimney wastefully as smoke. In a side-flue oven when the gases are burned out of the coal, and the fuel is in the condition of coke, the oven cannot be readily heated by radiation from the white-hot coke owing to the comparatively small aperture of the furnace, but by convection the products of the burning of this coke convey the heat to the surface of the oven.

Reference has already been made to the heating effects on the oven sole of the radiant heat from the highly heated crown. This is probably one of the most effective sources of heat in the case of the side-flue oven. The

crown is very near the sole, and it is heated up by the contact of flame to almost a white heat, in which condition it radiates a great quantity of its heat to the sole. The heat in a side-flue oven is intense but essentially superficial. It is produced in a very strong draught in a short time, and from the burning of as much fuel as, or more fuel than, would be required to heat more "solidly" an oven of equal size of the Scotch type. After the oven is "clear", which is the sign that it is sufficiently heated, it is much too hot on the crown for baking bread, or indeed for goods of any kind, and in consequence a stated time, say half an hour, is allowed for the oven to "lie down", so that the excessive heat may be absorbed further into the interior of the oven material, from which again it may be paid out in a steady stream during the course of the day's work. But as this type of oven is easily and quickly heated so it is also easily cooled. The cooling is accelerated by the manner in which the crown is usually built. There is no ledge between the top of the door in most cases and the spring of the arch, but the open door almost exposes the oven for its full height except the very small curve of the arch. In consequence of this every time the door is open the hot air, right up to the crown, rushes out, and cold air from outside rushes along the oven bottom to take its place. Some builders arch the crown very little and keep it low, and this has no doubt the effect of making the oven easily heated with the minimum quantity of fuel and of obtaining the maximum value of the heat in the baking chamber, but, as just indicated, it also facilitates loss of heat every time the door is open. There is a limit to the flatness of an oven crown, and in any case the less arched it is the greater is the strain on the oven walls. The writer is familiar with a case in which a number of ovens were built with perfectly flat crowns. Steel ⊥ girders were placed transversely across the oven, and between these beams stones similar to those forming the sole were fixed. The oven was then simply a flat stone box with iron plates running across the top. The experiment was a total failure. The fuel used was coke, but no appreciable draught could be obtained, partly because of the flat roof and partly because the draught was intercepted about every foot by the thickness of the projecting iron plates. The hot gases from the coke fire necessarily tended to make their way along the crown, but the series of projecting plates, although not more than ¾ in. deep, were sufficient to direct the currents momentarily downwards, and their progress was therefore arrested by the eddies thus produced.

Heating in Side-flue Oven.

Flat-crowned Ovens.

Side-flue ovens, to those familiar with them, are economical and efficient, and they are particularly suitable for baking crusty bread and for small goods after the bread is baked. When an oven of this type is in use for a mixed trade the usual practice is to give the oven a second fire after the bread is baked, but only a small one is needed. The greatest defect in this type of oven is that it is in no sense continuous. Between every two batches it requires more firing, thus breaking the continuity of the work. A Scotch

Advantages and Disadvantages of Side-flue Ovens.

oven, on the other hand, is capable of baking at least three or at a pinch four batches of close-packed bread without any stoppage for firing between; and as these batches require from 1½ to 2 hours each to bake, the same quantity of heat would be capable of baking five or six batches of crusty bread which take from 40 to 45 minutes each.

Many attempts have been made to adapt side-flue ovens for burning coke. This has been successfully accomplished, but only by adopting measures suitable for coke-burning. It may be regarded as impossible without a forced draught to heat a side-flue or any sort of oven with coke from start to finish, in the short time required to heat a side-flue with flaming coal. When it is considered expe-

Use of Coke in Side-Flue Ovens.

Fig. 199.—Section of Oven through Furnace

dient to use coke as the fuel in a side-flue oven the furnace needs to be enlarged, not because coke requires more space in which to burn, but because it is necessary to burn a comparatively large fire very slowly in the same way as in a Scotch oven, and the ordinary side-flue furnace is not large enough to contain a fire that will keep alight for the length of time. The most efficient way of altering the furnace is to lower the bars about 3 inches, and allow them to dip slightly towards the interior of the oven. This makes the furnace a little larger at the bridge than at the door. In addition the top of the furnace should be sloped upwards so that it forms a continuous line with the oven crown. Double doors on the furnace in the usual way, and a fire block cased in iron, and hinged so as

to cover the mouth of the furnace in the oven, complete the necessary alterations. This fire block in the iron frame may be hung either from the top or the side, but in either case it must be fully open when the fire is burning, and a recess must be made into which it fits when open. The purpose of this fire block is to shut off the furnace completely from the oven chamber when the bread or other goods are being baked. In an oven with a furnace so constructed the mode of firing may then be exactly similar to that described for a Scotch oven. After the day's work is done a good bright coke fire is produced by blowing the oven for about fifteen minutes in the usual way; then the furnace is heaped up with fresh coke and the oven shut up, except that the ashpit door is left open about half an inch to admit enough air to keep the fire alight, and the damper kept open very slightly to carry off the fumes generated by the slow combustion. In the morning or at the beginning of the day's work the clinker is removed from the furnace *after* the fire has been blown till it is bright; then about five shovelfuls of coke are thrown on, and the fire blown for about half an hour or less according to the kind of work to be done. The large all-night fire gradually compensates for the heat that was used in the previous day's baking, and raises the whole of the materials of the oven to a sound baking temperature. The shorter sharp fire in the morning gives the necessary surface intensity to supply the bloom on bread or small goods baked. It is then that the use of the fire-block stop comes in. It is turned down and the furnace effectively shut off from the baking chamber, but the fire in the furnace is still alight and must be kept so, as this type of oven cannot be heated to the same "solidity" as one of the Scotch type, and it is necessary to supply a flash heat between the batches. It would be quite ineffective to relight a coke fire on each such occasion; hence the need for keeping a bright fire ready for use immediately it is required. To this end the furnace is provided with another damper not connected with the oven chamber, and while the furnace block is down during baking this damper is open slightly to take away the fumes if the fire is intended only to burn very slowly, or it may be opened full while a batch is drawing to get the fire up to a high degree of brightness, so that it may be turned into the oven at once by raising the block as soon as the oven is empty. Worked in this way, and with furnace fittings of this description, there is no difficulty in using coke or anthracite coal in a furnace or side-flue oven, and the arrangement effects a considerable saving in fuel.

The description of internally heated ovens already given nearly exhausts the types of this sort with which we are familiar in Britain.

Austrian Oven.

In Austria there is an internally heated type used both for plain bread and fancy rolls in which the furnace bars are placed directly in front of the oven door. The bars are sunk about an inch under the surface of the oven bottom. The fuel used may be either coke or wood faggots. There are one or more flues fixed at the head of the oven, so that the heat may be directed to one side or the other as desired by opening either damper. The fuel is heaped up as in an ordinary fire on this

flat grid and allowed to burn, the draught being supplied in the usual way through the ashpit. When the oven is sufficiently heated the bars can be tilted and the ashes tipped into the ashpit, all the ashes scattered in the oven being drawn into the same receptacle. The sunk grid is then covered with a thick iron plate, which, when in position, is flush with the oven bottom. The peel, in setting the bread, slides back and forward over this plate, which is really indistinguishable from the oven bottom. This seems a rather ingenious way of heating an oven, and for the low calorific value of the fuel used it seems efficient and economical. Some of the ovens of this type are round internally while some are of the usual oblong shape. The ovens, except for the ashpit, are built quite solid with thick tile bottoms. A point of some interest in their construction is that the part under the tile sole is filled wholly with loose dry gravel, the purpose being to conserve the heat of the bottom as much as possible, and to this end gravel is really more effective than solid material, the air spaces between the small stones acting as better non-conductors than even the solid material of the gravel. Loose filling of this kind is cheaper, and does not expand with heat as may solidly built material when that is used for filling.

The ovens hitherto noticed have all been of a perfectly simple kind, internally heated, and with only one damper to regulate the fire, although a small steam damper is a common fitting, even in such ovens, to let off the steam before starting to draw the bread. There is nothing complicated about the building of such ovens and little difficulty in their working, and there are no patents involved in their construction. They can readily be built by an ordinary bricklayer under the direction of the baker.

Externally Heated Ovens.

Externally heated ovens are for the most part proprietary structures involving special features patented by their respective builders. The simplest of such ovens consists essentially of a brick or tile chamber, under the bottom and over the top of which a series of flues communicating with the fire at the back of the oven are conducted. The top of the bottom set of flues is usually built of fire blocks to withstand the great heat of the combustion products as they first leave the furnace. These flues can all be regulated together by a single damper fixed in the chimney, or each flue can be regulated by a separate damper so placed in its passage as to increase the top or the bottom heat at will or to direct the heat to particular parts of the oven. The fuel used in ovens of this type may be either coal or coke, although the latter is in more general use. This type of oven is another example of a case in which it is advantageous to burn the coke at two stages—that is, first to produce carbonic oxide in the furnace, and then to burn that in a long blue flame in the first section of the flues into carbon dioxide (CO_2). The total heat is the same as if the coke were properly burned at once in the furnace to CO_2, but the flame of CO in the flues carries forward the point of maximum heat a good distance from the furnace, and therefore provides a better opportunity for the top flues to get their full quota of heat than if the heat maximum were in the furnace itself.

There is very great variation in the efficiency of externally heated ovens. Unless the flues are carefully built and of first-class material there is a constant danger of parts collapsing, as they are burned out, and choking up the passage. As the flues need to be periodically cleaned out from soot, boxes are conveniently built in for the purpose, and as this may be roughly done by a careless man, another opportunity is afforded of either choking up the flues by pushing the soot into the bends and corners, or by actually disturbing or breaking the brickwork of the oven. Other disadvantages attending the use of the ordinary externally heated oven are the difficulty of getting up the heat of the oven chamber quickly if it has been allowed to cool unduly, and the further difficulty of cooling the interior rapidly if it should be overheated, as the heat is necessarily solid. The hollowness surrounding the oven chamber increases the liability to the formation of cracks in that chamber, with the consequent loss of heat and loss of steam while the baking is proceeding. The quantity of fuel needed in an oven of this type is greater than in one heated internally. The advantages pertaining to these ovens are the comparative cleanness of the oven chamber and the absence of ashes, dust, and excessive heat, from the furnace, within the bakery. Then the ovens are practically continuous, because the fire can be kept going while the bread is baking, and so batch after batch can be baked without stopping. This saving of time enormously increases the capacity of the oven over the ordinary side-flue type.

Advantages and Disadvantages of Externally Heated Ovens.

External-flue ovens, generally referred to as hot-air ovens, have been largely adopted in the south and west of England and in the Midlands, but have not found great favour in Ireland or Scotland. An oven of this type, but modified to get rid of some of the disadvantages referred to, was designed and patented a few years ago in Scotland, and has met with a fair measure of success. This oven, called Scott & Richards' "Peeler" oven, is adapted for either close-packed or crusty bread, or for small goods, and may be built for peel use or as a draw-plate. By an ingenious arrangement of dampers it is possible to direct the heat from the furnace directly into the interior of the oven, and so provide an intense "flash" or surface heat at will. When the oven is very hot and goods requiring a cold oven are to be baked it can be cooled down very rapidly. The writer had an opportunity of working with this oven under circumstances disadvantageous to the oven—it had been built less than a week—yet it was thoroughly efficient to bake both crumby and crusty bread, and by the use of the various dampers already mentioned, lighter goods than bread were baked before and after the batches. The oven also showed a most favourable record in consumption of fuel.

Hot-air Ovens.

Amongst externally heated ovens one of the best known is that called the Baker's Patent (fig. 200). In this oven the flues are external to the oven chamber, but to obviate the difficulty of supplying a flash heat when necessary the actual flame from the furnace can be directed into the oven chamber. This oven has therefore the advantages

Baker's Patent Oven.

of the cleanness and continuity of the externally heated oven with the adaptability of the side-flue oven for getting up an intense surface heat when required. To ensure a comparatively moist atmosphere in the oven, when desired, iron channels are sometimes built in the side walls in the

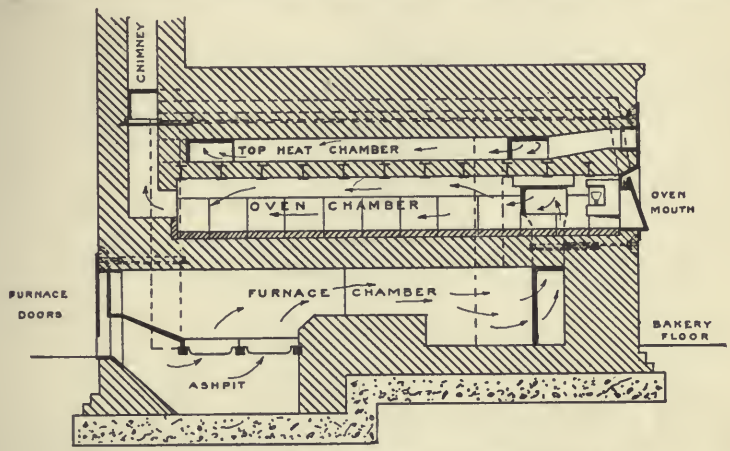


Fig. 200.—Baker's New Patent Hot-air Peel Oven (fired at back)

oven along which a quantity of water can be directed at will. Those familiar with this type of oven speak highly of its continuous baking properties, and of the small quantity of coke needed for its heating. But it is an oven that needs to be managed with care; otherwise the adaptability to emergencies which the several dampers make possible may

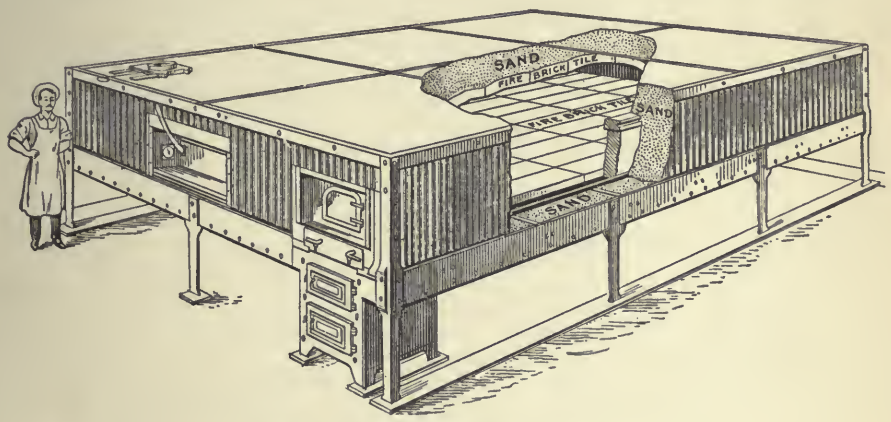


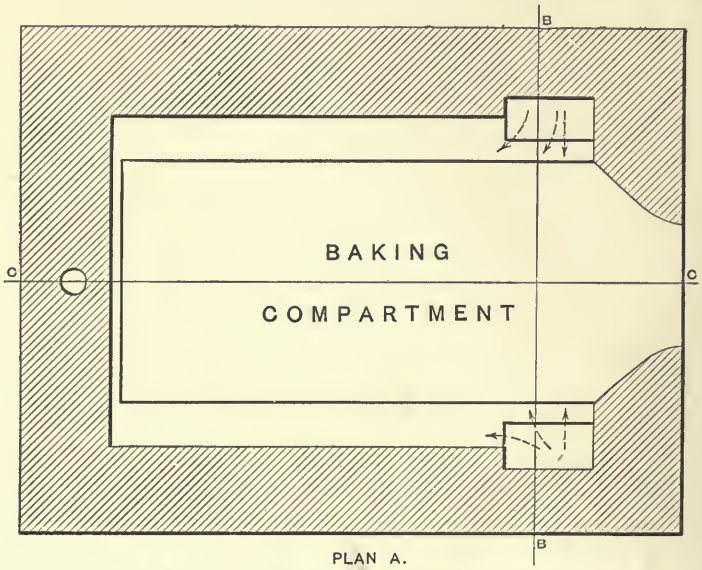
Fig. 201.—Typical American Oven of Flue Type

readily be a disadvantage for the single purpose, say, of breadmaking. This oven is now in use so extensively in peel and drawplate forms that its reputation is firmly established.

These externally heated or hot-air ovens belong essentially to the class of chamber ovens. These may be defined as those in which the products

of combustion do not enter the oven chamber (exceptions have already been noted), the oven chamber being really a highly heated brick or iron box. There are, however, two distinctive

Chamber Ovens.

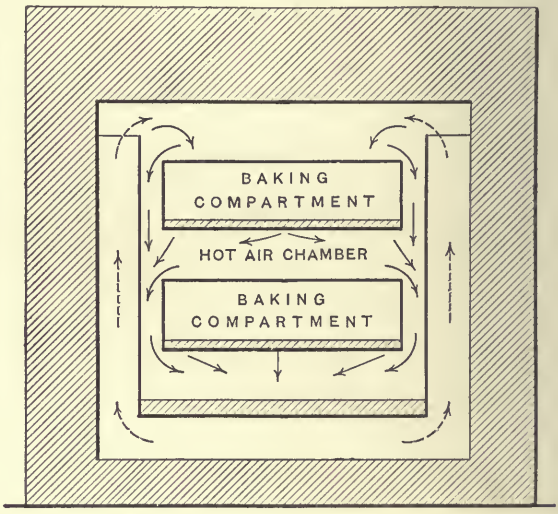


PLAN A.

Fig. 202.—Cox's Heat Trap Oven: Plan A A (see fig. 204)

types of ovens in use in this country that better deserve to be called chamber ovens, as in both types the baking compartment is within a large brick chamber highly heated externally. The ovens referred to are that known as *Cox's Heat Trap Oven*, and the mechanical type called the *Reel Oven*. The first mentioned consists of a large brick chamber (figs. 202–204), underneath one side of which there is a comparatively small furnace to burn coke. This furnace has communication with the chamber already referred to by flues running under it and upwards through flues in its four corners. The products of combustion therefore enter this chamber at the top, but cannot find egress to the chimney until they descend to the bottom, for the opening of the flues

Heat Trap Oven.



SECTION B.

Fig. 203.—Cox's Heat Trap Oven: Section B B (see fig. 202)

to the chimney—of which there are four at the sides—have their open ends near the bottom of the large chamber. The effect of this arrangement is to make the highly heated products of combustion descend to the bottom, parting with their heat gradually on the way. The baking chambers consist of iron flat boxes suspended or fixed within the heated chamber referred to. The atmosphere of the latter being highly heated, quickly by conduction passes this heat through the sheet iron to the interior of the baking chambers or boxes. The theory is that the heat in the large chamber should be alike throughout, but in practice it does vary slightly, and the variation is in the opposite direction to that shown in the ordinary

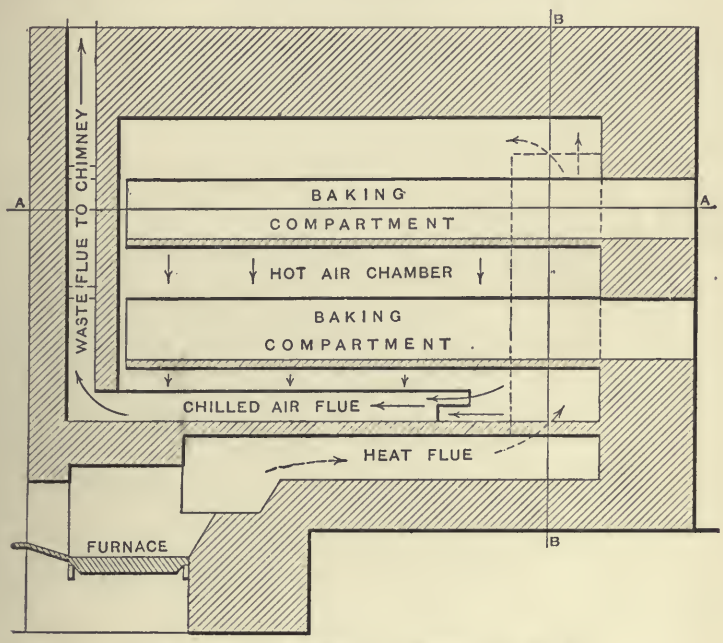


Fig. 204.—Cox's Heat Trap Oven: Section c c (see fig. 202)

type of decker oven; the top oven in this case, if there are two or three, one above the other, is hotter than the bottom one. The baking chamber is quite flat in each case, and has no direct opening into the hot chamber in which it is fixed. The heat throughout the oven, with the slight exception referred to, is therefore alike, and the writer is informed by those who are habitually using this type of oven that the loaves or other goods are baked with great regularity. The most advantageous point about this oven is its economy of fuel. The arrangement of flues is conducive to a very slow draught in consequence of the drawing flues having their openings at the bottom of the heating chamber. The descent of hot air is naturally a slow process, so that when it gets to the chimney it is likely to be comparatively cool, much cooler at any rate than the hot air in the chimney of a side-flue oven. This reduces the speed of the draught in the former. But it is

Economy of Fuel.

quite evident that if a slow-burning coke fire can be made to supply all the heat necessary to bake batch after batch of bread or other goods, then a given weight of coke in such a furnace is likely to last longer than one in which the draught is quick, because the air in the chimney, after it has passed its work, is very hot. The products of combustion in this heat trap oven should part with the greater part of their heat in actually heating the baking chambers. The ovens are continuous. They can be built in tiers of two, three, or more, and for use with the peel or as drawplates. The writer has not personally used these ovens, but from trade friends he has received the assurance that the ovens are very efficient, and that in practice they faithfully bear out the claims made for them in the matter of low consumpt of fuel and fitness for steady work.

Reel Oven.

The other type of chamber oven alluded to is the reel oven (fig. 205). This oven is said to have been patented in America by a grocer named Adams who took up baking early in the last century. It is not subject now in Britain to any patent rights, and as a bread oven is much less used than it was some twenty to twenty-five years ago, but is still extensively used in American and Canadian bakeries, and has there been very much altered from the original form and brought quite up to date both in the matter of fuel and in the automatic attachments with which it is fitted. The essential points about a reel oven are: that it is a large brick or insulated iron chamber nearly square internally, with one or two furnaces underneath that have flues outside the back of the chamber. The products of combustion do not enter the baking chamber but are confined to the flues. In the baking chamber is an iron frame, between the sides of which iron shelves, about 2½ ft. deep, and with backs, are suspended. These shelves extend the full width of the oven. The oven door also extends the full width of the oven, like the door of the modern drawplate. The internal frame revolves, either by mechanical or hand power, while the bread is baking. It is only suitable for baking tin bread, although it has been largely used for biscuits. The shelves can be stopped exactly in front of the door to be filled or emptied. When all the shelves are full the frame is kept turning slowly but steadily for the full time the batch is baking, the purpose being, of course, to bake the bread on all the shelves alike, for otherwise those at the bottom of the oven and those near the flues would be much overbaked, and those near the front of the chamber would not be sufficiently baked. The revolving arrangement gets over

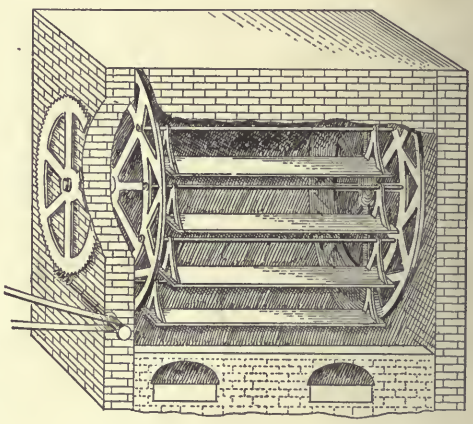


Fig. 205.—A Reel Oven

this difficulty in two ways: by assisting mechanically to equalize the temperature of the oven atmosphere, and by moving the loaves slowly through and out of the hottest parts just above the furnaces. This sort of oven is not economical for a small trade, but is an efficient and quick baker where there is a very large tin-bread trade done. The oven, however, was never in common use here, except in the large Glasgow factories, in one or two in London, and in two in Ireland. It has now been almost

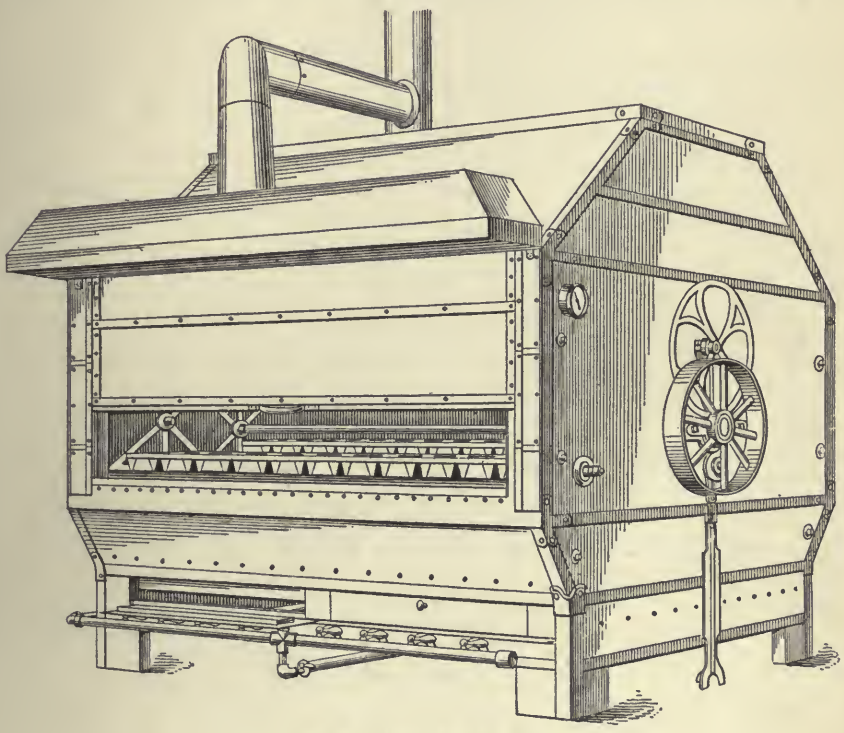


Fig. 206.—American Reel Oven

if not quite discarded. Its good points are its large capacity and economical working in factories where the machinery is always running. The faults that have caused its displacement are the great labour and excessive strain it imposed on the men in charge of it; the tendency to break down of some of the moving parts; or the accidental tipping of a shelf or of one or two tins, which would cause the stoppage of the whole machine and spoil a whole batch, as there was no means of getting out the loaves except by the door, and they had to remain till the oven had cooled.

Merits and Defects of Reel Oven.

This type of oven was introduced here directly from America, and in those bakeries where it was in use was generally referred to as the Yankee oven, but the originals were known in America as the "Boomerang" ovens. As noticed above, they are still extensively used there, and the latest development is to

"Yankee" or "Boomerang" Ovens.

have the oven built on an iron frame, the two ends of which are Λ-shaped. The spindle of the movable frame has its ends in bosses at the apex of each Λ-shaped standard. The shelves are arranged in the same way as in the older type, but the door for filling is situated down near the bottom of the chamber; and in one patent oven there is a mechanical tipping arrangement with an opening in the bottom of the oven opposite to the filling door, by which the shelves, as they reach that arrangement after the bread is sufficiently baked, are tipped up, and the tins slid on to a flat trolley that automatically stops in position to receive them. The use of coal or coke as the heating agent is being discontinued, and producer gas is being adopted. As this can be effectively burned in long series of burners under the ovens and cased in, no furnaces are needed, and on this account the ovens can be fixed on the logs some distance above the floor to allow the trolley already spoken of to run under the oven into position. An oven built on this system is in a large Toronto bakery, and is the patent of the proprietor. Fig. 206 shows one of the latest type of reel ovens heated by gas, as in use in several large bakeries in the United States.

Rotary Oven.

While on the subject of ovens with mechanical parts, it may be of interest to notice the round oven in which the sole is made to revolve to facilitate the setting of the bread, and which may also be turned from time to time while the bread is baking. This type has never, to the writer's knowledge, been in common use in Britain, but is still extensively used in Germany and Holland for ordinary bread-baking, and finds some favour also in the United States, probably amongst the foreign bakers, who almost dominate the baking trade there. Fig. 207 shows the parts of such an oven. This type is designated the "rotary oven", and also belongs to what has been called the chamber class.

Travelling Ovens.

Travelling ovens, that are now almost universally used in biscuit factories for cakes as well as biscuits, have not yet been adopted for bread-baking, but it is probable that something in that way will be one of the developments of the very near future. Whenever the automatic working of the moulding and proving machinery is perfect, the need for a perfectly continuous and automatic oven will be one of the necessities of the large bread factories. There is no mechanical difficulty about such an oven that could not be easily overcome to fit it for baking bread. Tin or crusty loaves can be properly baked in from 45 to 60 minutes, and there is no reason why the speed of the travelling oven could not be timed accordingly. Already in cake and biscuit factories small cakes are baked in travelling ovens, and as these might readily be spoiled by any jarring or bumping while the cakes are in their soft state before setting, it is evident that the movement must be gentle enough to prevent any harm coming to bread. With loaves of the crusty sort there would not be the least difficulty, but even with crumby, close-packed kinds the obstacles to be overcome are by no means insuperable. This development seems to be the natural complement to the automatic moulding and proving plants which are now being so extensively adopted, and the

WELL-KNOWN CATERERS

WILLIAM KIRKLAND, a native of Airdrie, in Lanarkshire, received a business training in Glasgow and Liverpool, and afterwards established a successful catering business in London under the name of Kirkland's Cyprus Restaurants. This was amalgamated in 1895 with Messrs. Slater's, Ltd., of which Mr. Kirkland is joint managing director and general manager of the catering department.

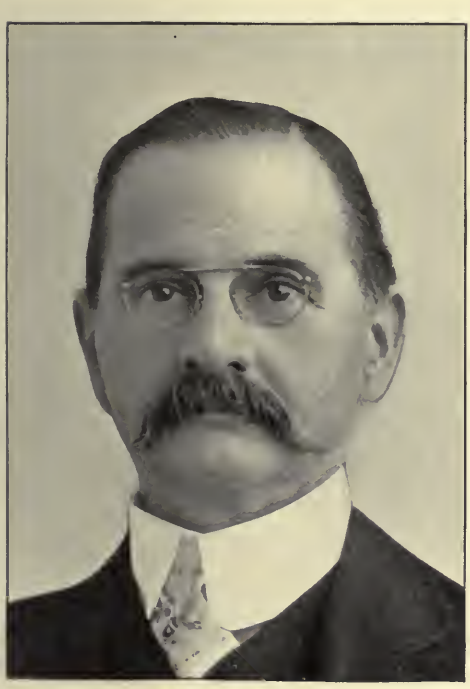
ISIDORE SALMON, born in 1875, is a director of Salmon and Gluckstein, Ltd., and general manager and a director of Messrs. Joseph Lyons & Co., Ltd., probably the largest catering firm in Britain. He was elected to the L.C.C. in 1907.

HENRY J. R. MATTHEWS, born at Plymouth in 1849, served an apprenticeship with his father there, and then sought experience in London and Paris. He started the confectionery, preserve, catering, and restaurant departments of the firm of Henry Matthews & Sons, Ltd., of which he is now managing director. He was for three years President of the Plymouth Master Bakers' Association, and is a member of the Council and Executive of the National Association.

THOMAS STEVENS was born at Wrexham, and served an apprenticeship as a confectioner in London. He gained further experience in New York, Philadelphia, and Paris, and in 1887 started on his own account in Cardiff, where he has now a flourishing business as caterer and confectioner.

WILLIAM KIRKLAND
(London)

I. SALMON
(London)



H. J. R. MATTHEWS
(Plymouth)

THOMAS STEVENS
(Cardiff)

WELL-KNOWN CATERERS

firm that will first use ovens of this type for bread will have a considerable advantage over others. Economy would, of course, be obtained only in the case of a factory with a very large output.

Returning to methods of oven-heating, a few notes must now be given on the system that is really characteristic of our time, viz. heating by steam pipes. Even amongst bakers there is still much ignorance as to the principles by which steam is applied for this purpose. There are now many forms of steam-pipe ovens, with variations in the method by which the heat is applied, but all the systems agree in this particular, that the steam is enclosed in a steel or iron tube sealed at both

Steam-pipe Ovens.

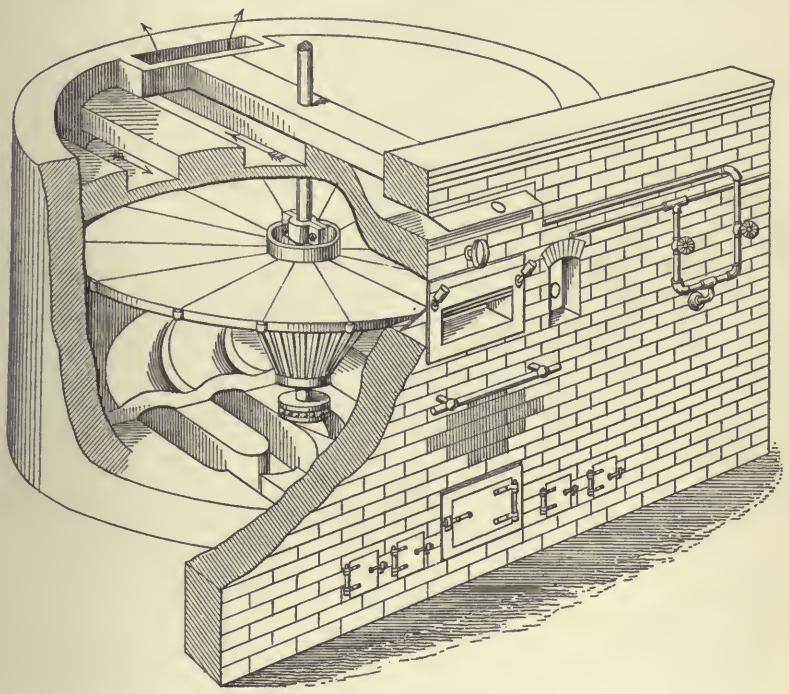


Fig. 207.—American Rotary Oven

ends, the steam never being allowed to escape unless the pipe or tube bursts. The tube, which may be straight or bent according to circumstances, may be about 10 or 12 ft. long, its solid walls about $\frac{3}{8}$ in. thick, and the bore or hole running through it about $\frac{1}{2}$ in. in diameter. In preparing the tube for an oven it is sealed at one end, and a quantity of water that has previously been freed from air by boiling is poured into it. The tube is filled to a little over one-third its total capacity, or in some cases it is filled about half its total length. The quantity of water actually in the tube may be from $1\frac{1}{2}$ to 2 pt. After filling, the open end of the tube is carefully welded. These pipes are built into the ovens so that they slope towards the furnace, the object being to ensure that the end actually in the furnace, or at least subjected to its intense heat, contains

water in the liquid state; otherwise the ends of the tubes would readily fuse and burst. The reason that water and steam are the agents or vehicles by which the heat is conveyed to the baking chamber is because water is the best heat-retaining liquid known. This, of course, also implies that it is the most difficult to heat up to any definite intensity; a given weight of it requires a greater quantity of heat to raise its temperature through a given number of degrees than the same weight of any other substance. This property of absorbing heat is called the specific heat of a substance, and water therefore is said to have a greater specific heat than any other substance. The quantity of heat which would raise a pound of water from 0° to 100° C. would be sufficient to raise a pound of iron from 0° to about 900° C., that is to a dull-red heat. It follows that in cooling down again from 100° to 0° C. the pound of water would give out as much heat as the pound of iron in cooling from 900° to 0° C. This is the reason that water is so suitable as a means of heating buildings and as a means of heating ovens. It explains why steam-pipe ovens have to be heated comparatively slowly. The water in the pipes is not wholly converted into steam, but mostly continues in the liquid state. As soon as it reaches the boiling condition a small portion is converted into steam, and as this cannot escape it produces great and increasing pressure on the water still remaining, so that the latter is not converted into steam.

High Specific Heat of Water.

It may be interesting here to state that the originator of the system, Mr. Perkins, whose descendants are still actively engaged in oven-building, was an eminent engineer, the author of many patent appliances relating to steam and hot water for heating purposes. It is stated that his main purpose in coming to this country from America was to put before the British Government an appliance called a water gun, which was to eject projectiles by the force of water heated to a high degree under great pressure. Amongst the bakers who originally assisted the inventor by experimenting with his ovens was Mr. Neville, the founder of the large London bakery firm. The steam-pipe oven as first arranged did not, as now, consist of rows of single pipes each independent of the other, but had series of pipes jointed together with screw couplings, so that the whole ovenful was virtually one pipe with many bends. As the pressure with highly heated water and steam was very great, the utmost trouble was occasioned by the joints leaking, and one expedient after another was tried to make the joints quite tight under pressure, but without success. Ultimately the plan was adopted of making the pipes in straight lengths with both ends sealed as at present.

Inventor of Steam-pipe Oven.

The original patent for the construction of steam-pipe ovens having expired, the principle has been adopted by nearly all oven-builders, some following the lines of the original builders, others adopting different methods of applying the same principles to the heating of ovens. The firm of Werner, Pfleiderer, & Perkins, with which

Various Forms of Steam-pipe Oven.

the original firm of steam-pipe oven-builders is incorporated, has the bottom row of tubes as the firebars; then, in the case of a peel oven, there is only one other row of pipes which supplies the heat to the top of the oven, but if the oven is of the drawplate type, then, besides the row under the fire, there is another row which projects a few inches into the furnace and above the fire but also under the drawplate. In these ovens, therefore, there are two rows of pipes under the plate and one to supply top heat. This extra heat under the plate in the case of a drawplate is to compensate for the loss of heat occasioned each time the plate is pulled out.

Theoretically it seems strange to make the ends of the bottom row of pipes as the furnace bars. Heat ascends, and it might be surmised that pipes under the fire would in consequence not become sufficiently heated, but in practice the close contact of the ends of the pipes with the fire compensates for the position *under* the fire and they become sufficiently heated. Two conditions determine how much or how little heat the ends of the pipes above the fire will obtain—namely, length of exposure and distance from the fire. The ends of pipes that project into the furnace directly above the fire are not exposed more than 1½ to 2 in. The whole efficiency of the oven, in fact, depends on whether the length of pipe is exposed just enough, or too little, or too much. If too little, the bottom heat of the oven may be less than enough; if too much, the bottom may have too much heat. A difference of half an inch in length of pipes exposed may make all the difference between efficiency and constant trouble with an oven either too hot or too cold. The row of pipes supplying top heat is some distance above the fire, and here again the length of pipe exposed determines whether the oven will have enough, too little, or too much heat on top. Remembering the principle already referred to, that radiant heat is inversely as the square of the distance from the source of heat, since these top pipes receive a good deal of heat by radiation, the closer they are to the fire the more heat they receive of this kind. In the steam-pipe oven under notice the top pipes are heated partly by convection — that is, by the hot products of combustion passing along and over them—and partly by radiation, so that it is the aim of the oven-builder to make these hot gases pass as slowly as possible over the pipes consistent with securing a sufficient draught to burn the fuel properly, and at the same time to adjust nicely the length of pipe exposed and the distance from the fire so that the pipes will not receive too much radiant heat to make the top of the oven too hot.

The section of the steam-pipe oven in fig. 208 represents a peel oven, and shows the manner in which the pipes are placed. To secure a slow draught a deadplate is in some cases fixed under the main damper, so that a limit is put to the width of the aperture through which the products of combustion can pass up the chimney whether the damper is pulled out to its full extent or not. This expedient had to be resorted to because of the weakness of ovensmen for

Use of Deadplate.

pulling out the damper to its fullest extent although it may not be necessary for the efficient burning of the fuel. With the fixed plate limiting the width of the aperture, the damper can only be used to reduce that width but not to increase it. Another expedient, the arrangement for which is also shown on the drawing, is to increase the bottom heat of the oven when necessary by shutting the damper, which stops the flow of air into the ashpit through the fire and up the flue, and directs this flow instead, in through the holes in the furnace doors, down through the fire, and along the ashpit to a flue at the side controlled by another damper. When this down draught is in use the ashpit door must, of course, be quite shut. Reference has been made to the influence of radiant heat in heating this kind of oven. The bottom row of tubes on which the fire rests are, of course, heated by conduction; the

Increasing Bottom Heat.

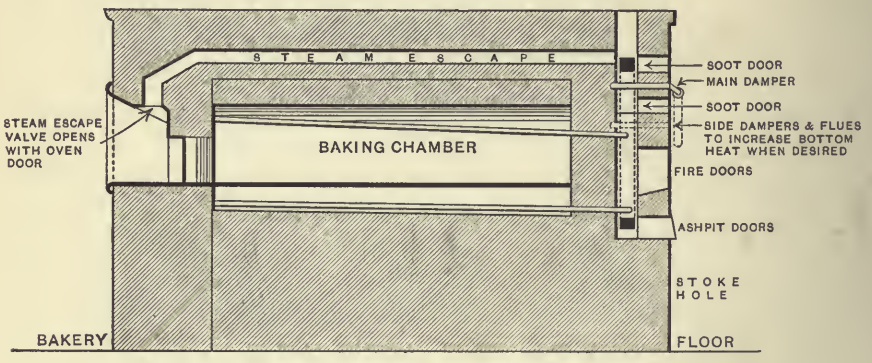


Fig. 208.—Section of Steam-pipe Oven

second row in a drawplate may be heated partly by conduction, by convection, and by radiation, according as the fire is large enough to touch them or not. The top row is heated, as already noticed, partly by convection and partly by radiation. The point is mentioned here to explain the reason for the instruction given for the heating of the ovens, that the fire should be kept comparatively small, or at least small enough to ensure that with the draught possible it can be raised to a white heat. When the fire is very large and heaped up it may become a bright-red only, with a flame of carbon-monoxide burning on top. The gases from a fire of this sort are very hot, and the currents of such gases passing along the top row of pipes heat them steadily, but such a fire does not give anything like the radiant heat of a much smaller fire in a state of incandescence—at a white heat. Yet radiant heat is a more effective and more economical agent for heating the pipes at a distance from the fire than convection currents. There is hardly any radiant heat obtained from the pale-blue carbon-monoxide flame on the top of a large fire. It is not to be understood that a very small fire should be maintained, but only that the fire should be no larger than the draught allowed will raise to a white heat.

Radiant Heat and the Carbon-Monoxide Flame.

In ovens of this type the furnace is very shallow but the full width of the oven. This form necessitates that the fire should always be spread very evenly; otherwise there is danger of one set of pipes being overheated and those in another part of the oven being much colder. In practice these variations may not be noticed, yet in the division between the two furnaces which constitute the full stretch of the oven some care is needed to keep that part of the fire as bright and clear as the part immediately in front of the furnace door. This is one of the very few troubles attending the effective heating of these ovens. In any case, however, the combustion is slow, and they cannot easily be heated in a hurry; but after heating they can bake steadily and evenly one batch after another if a steady fire is kept in the furnace, and about this there is no difficulty, since the furnace does not in any way communicate with the baking chamber. If the firing is done with regularity and care, this type of oven bakes bread and all sorts of goods with economy. It is necessary in this case, as in the majority of others, to arrange the order of the work to suit the condition of the oven, since the oven once cold cannot be quickly heated, and once hot cannot be quickly cooled.

The Firing of Steam-pipe Ovens.

There are a few peculiar points pertaining to steam-pipe ovens as a class that may be as well noticed at this point, although these peculiarities are not specially attached to the ovens under observation. Thus it is common knowledge amongst bakers using steam-pipe ovens that they do not always bake with the same degree of efficiency, although the temperature indicated by the thermometer may be alike when the variations are noticed. This is explained by the fact that the thermometer can only indicate the temperature of one of the agencies which go to produce the actual baking heat of the bread. That agency is the oven atmosphere. When bread is being baked, the sources from which the heat is derived are the oven bottom, the pipes at the oven crown, and the materials of the oven. The thermometer by which we register the temperature variations is not in contact with any of these, but is near enough to the top pipes to register the amount, or rather the degree of radiant heat they give out, which degree is about the same as that of the oven atmosphere near the exposed bulb of the thermometer. The degree of heat as registered by the thermometer, therefore, always bears a direct relation to the heat of the pipes, but it does not bear the same relation to the heat of the material of the oven. At the beginning of the day's baking the heat of the oven material above the pipes is about the same as the heat of the pipes, and when the latter cool a little on the oven being filled with bread, they are likely to receive some heat by radiation from the oven materials, which assists in the baking. But as the day's work proceeds the oven material, on account of steadily paying back heat to the pipes to assist in the baking process, becomes considerably cooler than at the beginning of the day's work. In such circumstances, if with a good fire the pipes are highly heated, this excess will readily show on the

Oven Temperatures.

thermometer, but the baking efficiency may not be quite as great as when the thermometer showed the same temperature earlier in the day, owing to the absence of augmenting or compensating heat from the oven materials.

Another peculiarity noticeable in thermometric readings of the heat of an oven is that while the temperature may appear to decrease very suddenly when a batch is newly set, or when the oven atmosphere is filled with steam for glazing purposes, yet it appears to increase several degrees when the batch is drawn or if the steam is allowed to escape. These decreases and increases are rather due to local effects on the thermometer bulb than to real variations in the baking temperature of the oven. The baking temperature is likely always to be considerably less than the thermometer indicates when the oven is empty, and more than the thermometer indicates when the oven is full. One other point about thermometers in ovens may be mentioned here with regard to the great variations amongst ovens as to their effective baking heat. Thus, the proper heat as indicated by the thermometer for baking a batch of bread may be as high as 600° F., while another oven of a different type may seem only to need 400° or 420° F. to produce as good a result. This difference may be in some part due to difference in the construction of the oven—the number of pipes used, their nearness to the goods baking, and the nature of the oven materials—but it is frequently also due to the position in which the thermometer is fixed with regard to the heating tubes. The oven that seems to heat up quickest is not necessarily the best baker, indeed is not likely to be the best baker, for the conditions that favour very quick heating in this type of oven are also those that favour very quick cooling. Thus an oven with say fifty pipes spread over the width of the oven would be easier to heat than one containing a hundred pipes in the same space, but the latter would keep its heat at least twice as well, and would therefore be the much more effective baker. Again, tubes that contain say one 1 pt. of water can be heated to any given degree more quickly than tubes containing 2 pt. of water, although the latter should have twice the baking capacity. A little difference in the quantity of water in the tubes may not seem of very much importance to the baker, yet very little difference in the individual pipes makes a substantial difference in the aggregate. An oven with say seventy-two tubes, containing 1 pt. of water each, would have 9 gal. of water in which to store the heat obtained from the fuel, but if those tubes had each say 1½ pt., the heat storage would then be the equivalent of 13½ gal. of water, and the total *quantity* of heat at any given temperature in this water is half as much again as in the smaller quantity. This shows how important to the baker is the amount of water in the tubes, and it may be mentioned that oven tubes are not all alike in this respect.

Baking Heat.

As already explained the method of heating steam-pipe ovens is by a coke furnace, in which the ends of the tubes are exposed to a varying extent according to their relative position towards the fire. In the Per-

kins oven, which is the original type (fig. 208), the bottom row of pipes constitutes the furnace bars, and as these only get that fraction of the furnace heat which descends, the extent of pipe exposed is much greater than if the pipes were above the fire wholly. The furnace in this type extends the full width of the oven. This necessitates two or three furnace doors. The pipes are quite straight, and the fire and the products of combustion come into direct contact with them; these pipes are heated partly by the hot gases, and partly and most effectively by radiant heat. To ensure perfectly equal temperatures in all the pipes, theory requires that the fire ought to be spread quite evenly, and theoretical considerations would also seem to indicate that, if the fire is not quite even, but larger and hotter in some parts than in

Method of Heating Steam-pipe Ovens.

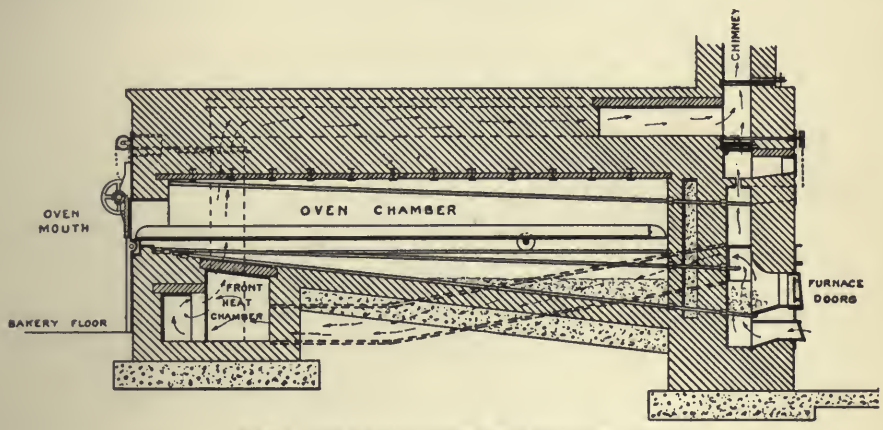


Fig 209.—Baker's Patent Steam-pipe Drawplate Oven

others, the pipes in those localities would get intensely hot and be in danger of bursting. In practice there is little or no difficulty experienced in this matter. So far as can be indicated in the baking properties of the oven, the temperature seems equalized, and although the bursting of a tube from overheating is not unknown, yet in this particular oven such a fault is very rare, and is now more infrequent than some years ago when the manufacture and sealing of steam pipes were not so well understood. Yet there is some difficulty in keeping a long shallow fire of equal brightness for its whole width. To meet this trouble, the builders of this oven are now building a much smaller furnace with only one door. The fire is on furnace bars and the steam tubes are all placed above the fire, so that only a very short piece of each tube is exposed to the heat. To get the ends of all the tubes into this small space, they are of varying length, to allow them to be bent in such a way that they still form straight lines of heat under the sole and along the crown of the oven. In the Perkins type of oven, the bottom was until quite recently made wholly of iron plates, but a new preparation that gives all the effect of tiles without the seams has been in use in these ovens, and can be fitted to any ovens of the older type.

It is curious that drawplate ovens are now usually associated in the baker's mind with steam-pipe ovens, yet the drawplate principle is applied successfully to ovens of the hot-air type. The original drawplate, or at least the one with which the trade first became familiar in this country, was called the "Weighorst", and was not a steam-pipe oven. In any case nearly all oven-builders who supply steam-pipe ovens are prepared to supply them of either peel or drawplate class, and in one or two decks, as required. When this type was first introduced, there was considerable trouble with the movable parts, especially in the case of imitators of the original builders. Small trolleys and rollers of various types were tried to make the plates easy-running, often with dire results to the poor baker and his batches. The difficulties are now quite overcome, and one hardly ever hears of any difficulty being experienced with the plates. It was for many a day protested that these drawplates, while suitable enough for baking the English sort of crusty loaves, were quite unsuitable for either the Irish or Scotch batched bread, but this prejudice has been completely broken down by experience, and now drawplates are in use in nearly all large factories. Improvements in details of the working parts of drawplate ovens are being gradually effected, but fundamental changes from original plans are more difficult. Thus in some types the trolley carrying the plate, or at least the end of the runners, is quite detached from these until the plate is being actually pulled out; but on the principle that in a bakery it is best to have every kind of mechanical appliance as simple as possible, it is perhaps better, at any rate the writer prefers, to have the wheels carrying the front frame of the oven as a part of that frame. An arrangement tried a few years ago was to make the oven bottom in lathes carried on chains. This bottom was not pulled out in drawplate fashion, but by a mechanical arrangement the loaves placed on the lathes at the oven front were carried into the oven chamber until the whole batch was set. When baked they were of course returned to the oven front in rows in the same manner. The object of this arrangement was to supply all the advantages of a drawplate oven for bakeries where the space was not sufficient to allow a long plate to be pulled out in the ordinary way. The plan did not seem to answer all the expectations of the patentees; in any case it was not adapted to many ovens commercially. But it is still a great difficulty in very small bakeries to install drawplate ovens, advantageous as these might otherwise be, on account of want of space, and to meet this difficulty the latest expedient of one of the leading firms of oven-builders is to use what is aptly called a split drawplate (fig. 210). The carriage of the split drawplate is pulled out into the bakehouse in the ordinary way but only half the distance. By an ingenious hand-wheel arrangement the front half of the plate is lowered enough to allow the back half to be pulled over it and loaded first; then the front half is raised and loaded. By this expedient only half the length of the plate is out at once, and very little room is needed in front of the oven, while some saving is also effected in the conservation of heat

Drawplate Ovens.

The Split Drawplate.

which follows from the plate in two sections being only half as long out of the oven for filling as the full-length plate must be, although the whole time occupied in this operation is not even in the latter case very great. The writer has had no personal experience of the "split plate", but is credibly informed that it is giving satisfaction.

The use of what is called "producer gas" for heating steam-pipe ovens has now reached a comparative degree of perfection in some cases only; in others there is trouble with both the "producer" plant in which the gas is made and with its application to the ovens. The firm that has successfully adapted it to their ovens has now plants working in several large bakeries. The description of the method

Use of Producer Gas.

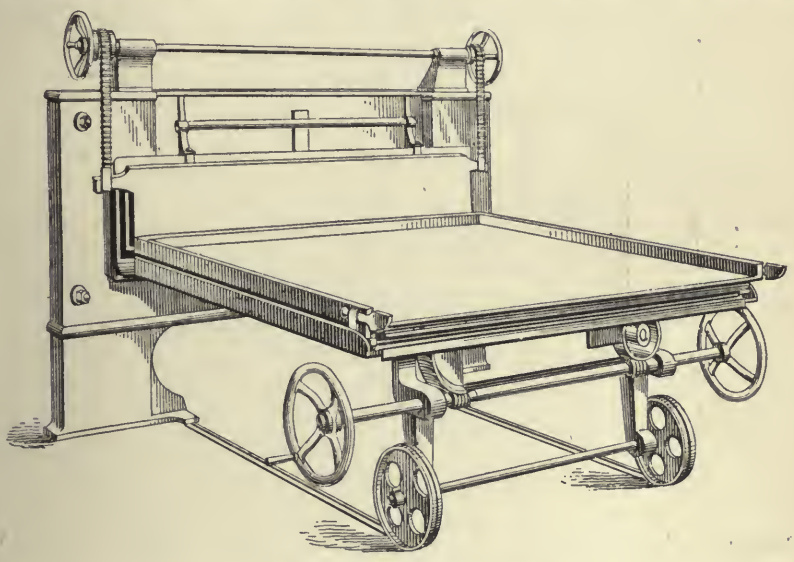


Fig. 210.—"Split" Drawplate Oven

of preparing the gas properly belongs to the chapter on fuel, and here it is sufficient to say that after it is made it takes the place of the ordinary coke fire in the furnace, but is burned in a special burner, which burns the gas mixed with air under the ends of the tubes, the air used for the purpose being previously heated by being allowed to pass through pipes placed in the flues for the purpose. Given an efficient producer that works without much attention, the economy and regularity of this kind of fuel can be easily surmised. It is under perfect control by taps like any other gas supply, and can be turned low or high as required, or turned out altogether. The pipes can be heated quickly, as compared with the time taken by an ordinary coke fire, and the heat can be distributed with uniformity. It may be pointed out, however, that the method of heating with gas is exclusively by convection—the flame may be in direct contact with the ends of the pipes, or the hot products of combustion passing over the pipes heat them. In this case there is practically little radiant heat effectively

used on the pipes, as the flame of burning carbonic oxide (CO), although itself very hot, has little radiant energy. Heating ovens by producer gas would not be economical if a plant and the burning apparatus had to be fitted up for only one oven, but for four or more large ovens the saving is considerable. It is highly probable that developments in oven-heating will be in the direction of the adaptation of producer gas for that purpose, and there seems to be no good reason why comparatively small plants for its erection should not be devised.

The steam ovens hitherto noticed have been those with straight tubes, or with tubes bent so that their ends may all be clustered in one small furnace, but there is now on the market another form of steam-pipe oven called

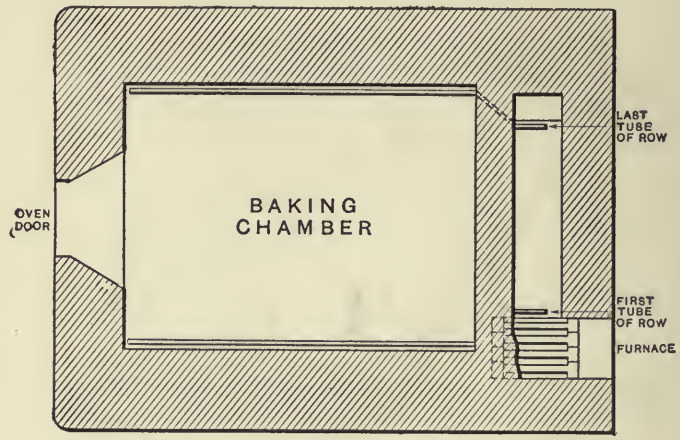


Fig. 211.—Hawkins' Patent Regulated Steam-pipe Oven: Plan

the "loop tube". In this particular oven the pipes are bent on themselves, so as to give practically double tubes at the front of the oven, so that the double heat supplied from these may compensate for the cooling effects due to the door. Ovens fitted in this way are well spoken of as being efficient bakers, the main advantages claimed for them being that they bake the bread uniformly to the front of the oven, and that the fuel required is not greater than in the ordinary steam oven.

Loop-tube Ovens.

There are many modifications of steam-pipe ovens now built so little different in principle from the original Perkins as not to require notice here, except that, as in all other kinds of manufactures, competition has induced some builders to economize in the wrong direction to enable them to produce cheaply—by using pipes of inferior quality, or by considerably reducing the number in the oven.

Inferior Steam-pipe Ovens.

One firm of oven-builders erect their ovens on a principle quite distinct from those already mentioned. The particular oven referred to is the Hawkins patent. In this oven the ends of the tubes are not in contact

with the flame, nor in the furnace at all. The furnace is comparatively small, with ordinary firebars. The heating tubes have their ends projecting into long shallow flues, through which the products of combustion must pass to get to the chimney. On the principle that the nearer the source of heat the shorter need be the length of tube exposed, these tubes project into the flues already mentioned in gradually increasing length the farther they are from the furnace. A reference to the plan of this oven (fig. 211), in which the first and last tubes in the bottom flue are shown, and to fig. 212, illustrates this point, and the claim of the oven-builder is that the varying lengths of pipe are so nicely adjusted that those farthest from the furnace are at exactly the same temperature, and are subject to the same internal pressure, as those near the furnace with

The Hawkins Oven.

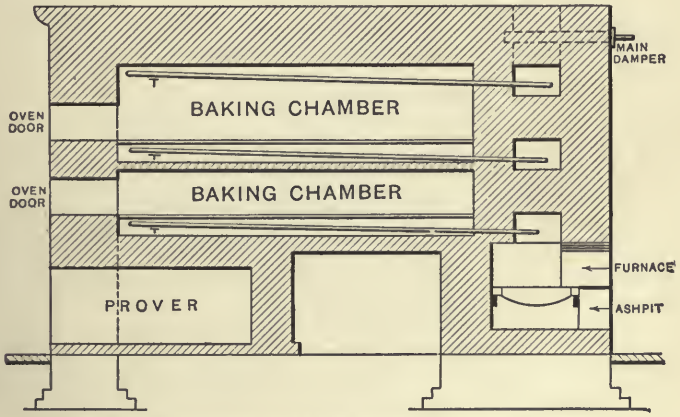


Fig. 212.—Hawkins' Patent Regulated Steam-pipe Oven: Section

a shorter length exposed, and on that account that there is no danger of tubes bursting. The method of heating here adopted is that of convection only. No radiant heat from the furnace can affect the pipes, and as the hot gases from the fire have to do all the heating, it is necessary that these hot gases should pass over the pipes as slowly as possible consistent with obtaining a good enough draught to burn the fuel properly, so that the pipes will absorb the heat. The fire is essentially a slow-combustion one. The patentee of this oven claims that it is extremely economical of fuel, and that two, three, or four ovens can be heated from one furnace, and all as nearly as possible alike, and that by an arrangement of dampers (fig. 213) the heat can be directed to either oven at will, or to the bottom or top of the oven as desired.

Probably the latest type of steam oven on the market at the time of writing is that with the registered name of "Hotso". This steam heating system is on entirely different principles from those applied in other steam-pipe ovens. In the latter the steam is under very high pressure —the pressure, in fact, increases with the temperature—and it is in sealed pipes, and never allowed to escape. In the "Hotso" oven the

"Hotso" Oven.

steam is superheated in a coil to a high temperature, and then is allowed to pass through series of pipes fixed in and under the baking chambers. These pipes in turn become highly heated, and radiate their heat into the baking chamber. After heating the pipes the steam is allowed to pass out of the oven, and may if desired be conveyed back to the boiler and condensed to water, heating up the water to boiling-point. The essential apparatus to heat this oven are a small water-boiler, which may be situated in any outhouse away from the bakery, a furnace, and a series of coils of pipes called a superheater, and the necessary main pipes to convey the superheated steam to the oven and taps to regulate or stop the supply. The steam as it comes from the boiler need not be under pressure; then it traverses a great length of pipes made up in coils, which are highly

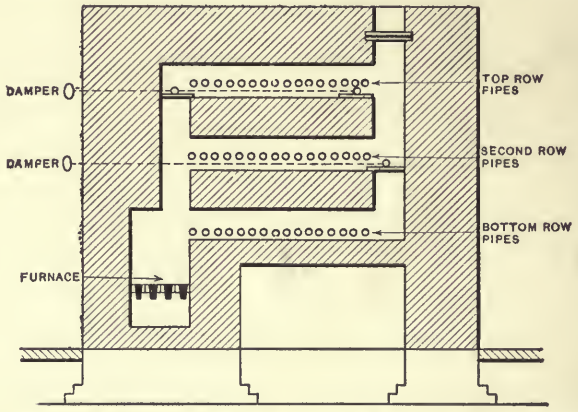


Fig. 213.—Hawkins' Patent Regulated Steam-pipe Oven: Sectional Elevation across Back

heated externally in a furnace, the fuel being either coke or liquid fuel. This superheated steam is then led—not under pressure, but simply as a moving current of heated gas—through the radiating coils at the top and bottom of each oven chamber, and then passes through an exhaust pipe, as described, back to the boiler, or to any other cooking apparatus required. According to the patentees, "the amount of superheated steam allowed to pass through any of the radiating coils (in the ovens) is regulated by a stopcock at the entrance to each coil, so that the supply can be cut off or diminished at will"; and again, "there is but little stored heat required in the walls, as it can be supplied evenly from the radiating coils. . . . A temperature of 450° F. can be obtained in from one and a half to two hours in an oven previously cold in ordinary practice." The writer has examined this oven and appliances, but is not aware of any yet tested in ordinary work. The superheating of steam *under pressure* is a well-known expedient for increasing its efficiency as a power agency, but it is quite a novel expedient to heat it *en passage* through a highly heated coil of pipes not under pressure, and the writer was not aware that steam under such circumstances could be heated up to the temperature claimed

in this case. On theoretical grounds it seems quite unnecessary to use steam as the heating agency, since dry air in sufficient volume passed through a coil of pipes, of which part was highly heated in a furnace, would readily acquire the necessary temperature, and if then passed through the heat-radiating pipes in the oven would part with its heat to those pipes more readily than steam under the same circumstances would. If all that is claimed for the oven can be substantiated, there would certainly be some advantage in heating or cooling an oven at will, and virtually doing the baking by a uniform heat, much in the same way

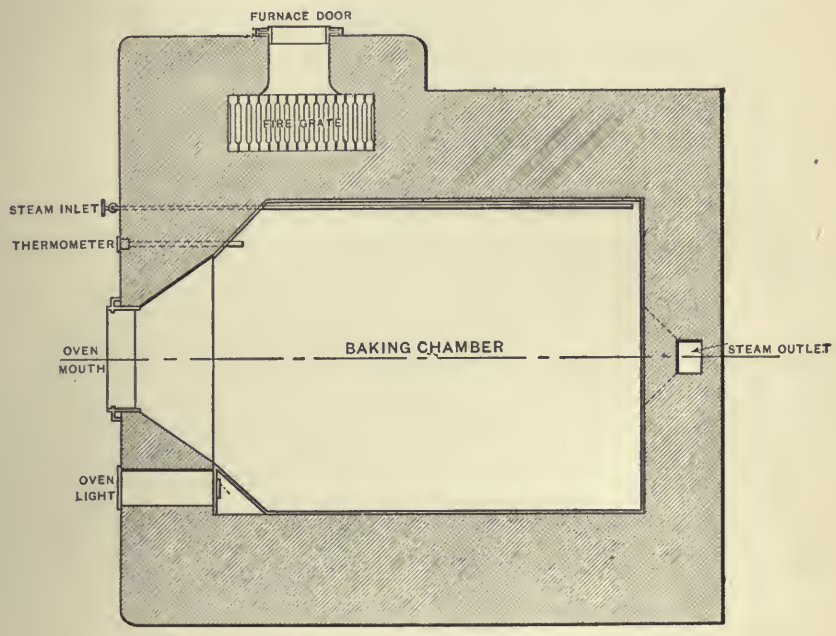


Fig. 214.—"Viennara" Patent Steam-pipe Oven: Sectional Plan

as an electric oven, and in being able to regulate the heat by turning a tap. But the oven will require to be tested commercially before it can be properly vouched for in the matter of efficiency and economy, and the longevity of the superheater can be properly tested, for on this evidently depends the whole value of the oven.

Allusion has already been made to Vienna ovens of the hot-air type, but the steam-tube system is quite as well if not better adapted for ovens with sloping bottoms, and the accessories necessary for baking bread in an atmosphere of naked steam. Figs. 214–216 show an oven of this class with the registered name of "Viennara". The plan shows the position of the furnace at the side of the oven, and the position of the pipe for the inlet of naked steam to effect the glaze on the bread. The longitudinal section shows the position of the steam outlet flue at the top of the oven, so that the steam may be removed from the

"Viennara" Steam-pipe Oven.

oven atmosphere, and the baking of the bread finished in a quite dry heat (see vol. i, p. 203). The front elevation shows the sliding door and the handle for control of steam damper, &c. This type of oven is now be-

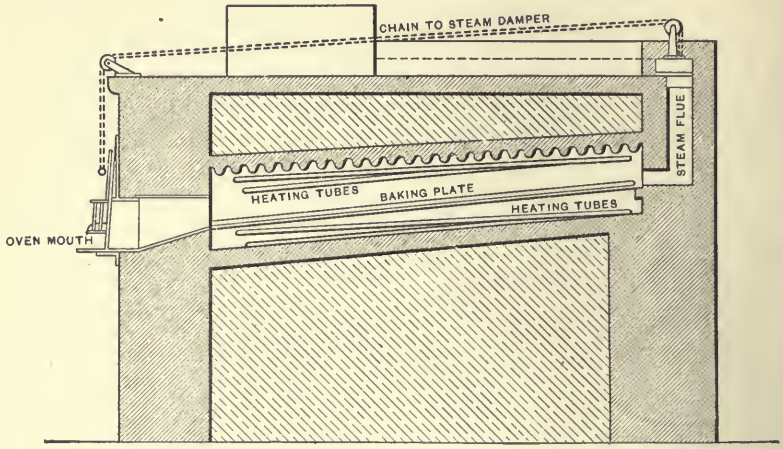


Fig. 215.—"Viennara" Patent Steam-pipe Oven: Longitudinal Section

coming much used here for Vienna-bread baking, and an oven of exactly similar construction is rapidly taking the place of the oldfashioned sort in Vienna, Berlin, and Continental capitals generally. The writer has

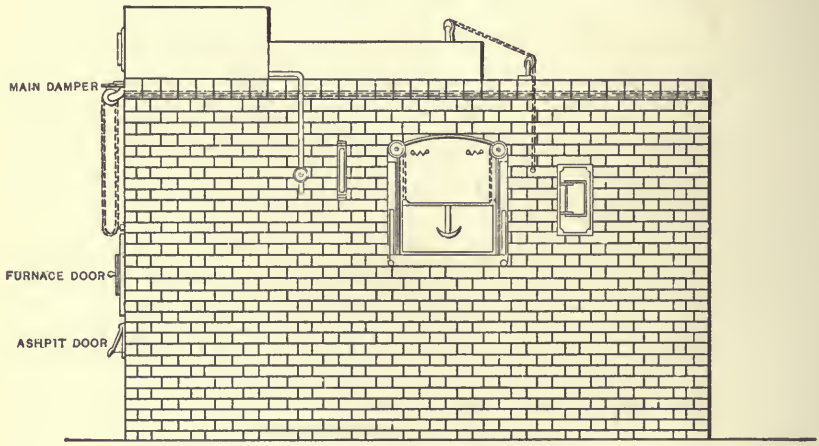


Fig. 216.—"Viennara" Patent Steam-pipe Oven: Front Elevation

been assured by those working with this oven regularly that it is very efficient.

A concluding general remark about steam ovens is that the essential things are the quality of the pipes, the maximum quantity of water in them, and the sufficiency of the number in the oven. The oven walls

should be substantially built, although not necessarily thick, and the part above the pipes should be well insulated with a good thickness of material, as it is important that the oven structure should to some extent act as a heat reservoir. The writer favours a small furnace, with the end of the pipes massed into small space, rather than the long furnace that needs careful spreading of the fuel to obtain uniform heating, for the smaller furnace seems in his experience to be more economical, because easier to control, and there is much less danger of losing the heat actually generated. He also favours furnace bars with all the pipes above the fire rather than that the pipes themselves should be the bars. These, however, are only opinions, but based on experience with various types of steam ovens.

Essential Points in Steam-pipe Ovens.

CHAPTER L

FUELS: THEIR COMPOSITION AND HEATING VALUES

Anything that burns will heat an oven, yet some care is needed in selecting fuel, and the cheapest is not always the most economical. Burning is a chemical process subject to the same laws as other chemical combinations. The carbon and the hydrogen of the fuel, whatever it may be, unite chemically with the oxygen of the air, and so produce greater or less heat. These two substances, carbon and hydrogen, are practically the only sources of heat in fuel, yet it must not be understood that they are always burned as pure substances. They are both present in organic materials, to which class fuels belong, as compounds, and the nature of these compounds determines the amount of heat they will give out when burned. Thus, if hydrogen is already combined with oxygen, it will be in the form of water, and from that portion of hydrogen no heat whatever will be obtained; but as much heat is required to convert the water into steam, the presence of any considerable quantity in the fuel will seriously reduce the total heat obtained from it. Again, if the carbon is combined in the fuel with the complete quantity of oxygen that satisfies it, it is already in the form of carbon dioxide (CO_2), which is the ultimate product of the burning of carbon in oxygen, and therefore cannot be further burned so as to produce more heat. But if one part of carbon has formed a compound within the fuel with one part of oxygen only (CO), that compound is combustible and will burn to CO_2, producing a great deal of heat while the change is being effected. It will thus be seen that the actual composition of a fuel is not a quite safe index of its heating power. There are other substances in fuel also that are themselves quite useless as heat-producers, but hinder in a mechanical way the burning of the combustible

Chemical Combination and Heat Production.

parts by imprisoning these to some extent, or by forming clinker on the furnace bars and considerably reducing the draught through the fire. Yet given the composition of a fuel, the theoretical heat production can be roughly ascertained, and after making allowances the heating values of different sorts of fuel can be compared. It is not necessary in a work like this to describe analytical methods of ascertaining the composition, but it will be sufficient to give the proximate analyses of fuels that are used in bakers' ovens or in stoves, with the ascertained calorific values. The tabulated figures here given may vary somewhat from figures obtained from other sources, which differences may readily be explained by real variations in the composition of various samples of the same kinds of fuel. The table, however, has been compiled from the best available sources, and the relative figures may be accepted as correct. One pound of fuel is the quantity to which the number of heat units given refers. The constituents in the composition are given in percentages.

Composition of Fuels.

Fuel.	Heat Produced in Heat Units. B.T.U.	Composition.					
		Carbon.	Hydrogen.	Oxygen.	Nitrogen.	Sulphur.	Ash.
Charcoal ...	8,000	100·0	—	—	—	—	—
Coke	7,400	98·4	—	—	—	1·22	5·34
Newcastle coal	8,200	82·12	5·30	5·7	1·3	1·24	3·77
Peat (dried) ...	4,700	59·0	6·0	30·0	1·2	—	4·0
Wood (dried) ...	3,547	50·0	6·0	41·0	1·0	—	2·0
Carbonic oxide	2,415	42·86	—	57·14	—	—	—
Hydrogen ...	33,800	—	100·0	—	—	—	—
Alcohol ...	8,000	52·17	13·04	34·79	—	—	—
Petroleum ...	10,700	85·0	13·0	2·0	—	—	—
Welsh coal ...	8,240	83·78	4·79	4·15	·98	1·43	4·91
Scotch coal ...	6,280	78·53	5·61	9·69	1·0	1·11	4·03
Marsh gas ...	13,100	75·0	25·0	—	—	—	—

As the free hydrogen in those fuels combines with the oxygen of the air to form water, and the carbon with the oxygen of the air to produce either carbonic oxide (CO) or carbon dioxide (CO_2), it is easy to see that these fuels will require different proportions of air to effect their complete combustion. Thus 1 lb. of pure hydrogen burning in air would need 35 lb. of air; 1 lb. of pure carbon if burned to carbonic oxide needs 5½ lb. of air, but if burned to carbon dioxide it requires 11 lb. of air; 1 lb. of dried coal needs about 4 lb. of air, and 1 lb. of dried wood only 2½ lb., while 1 lb. of peat (dried) requires 3¼ lb. of air for its complete combustion. A pound of coke needs 10 lb. of air to burn it thoroughly. These are, of course, theoretical figures; but they show how it is that some kinds of fuel take longer to burn than others, and they also indicate how a much stronger draught is needed to burn, say, 10 lb. of coal in a given time than to burn the same weight of wood. In the case of coke the

Air Supply for Combustion.

draught needed is not so great as in the case of coal, not because coke does not require so much air, for it needs more, but because the burning process is spread over a longer period. For the following descriptions of the various sorts of coal the writer is indebted principally to the large work on *Chemistry* by Roscoe and Schorlemmer.

Anthracite coal contains a larger proportion of carbon than other coal. Its condition and peculiarities are due to its having undergone the most complete change from woody fibre. This coal has a bright lustre, an iron-black colour, and is frequently iridescent. Anthracite gradually passes into bituminous coal, becoming less hard, and containing more volatile matter. As it burns practically without smoke when the draught is sufficient, it is largely used in all circumstances where intense heat and freedom from smoke are considerations. Under the name of "blind coal" it was, and probably is, used in Scotland for oven-heating purposes. The absence of volatile gases in anthracite enables it to be burned in almost the same manner as coke—without flame—yet in an oven in which this coal is used there is, especially on a fresh fire, frequently a long pale-blue flame. This is produced by the carbon of the coal being formed first into carbonic oxide, which is an inflammable gas; the flame is caused by this gas burning. Anthracite can also be used in place of gas coke in all types of ovens and furnaces for which the latter is suitable; but, except in favoured localities in the neighbourhood of anthracite pits, its price is so much greater than gas coke that the latter is most favoured.

Anthracite Coal.

What is called bituminous coal consists of a number of varieties with different chemical composition and yielding different products when burned. They have the common property of burning with a smoky flame, and yield on distillation volatile hydrocarbons and tar or bitumen, whence their name is derived. The most important kinds of bituminous coal are: (1) *coking coal*, which softens and becomes pasty or semi-solid in the fire, and yields, when completely decomposed, a greyish-black cellular mass of coke; (2) *non-coking coal*, which is much like the other in its chemical composition and in all its internal characters, but burns freely without softening and without any appearance of fusion: the residue it yields is not a proper coke, but is either in powder or in the form of the original coal. This is the common coal of commerce.

Bituminous Coal.

Cannel coal, sometimes called parrot coal, is a variety differing from bituminous in texture and containing usually more volatile matters, and on that account it is specially employed for gas-making. Cannel coal is more compact than bituminous, has little or no lustre, does not show any banded structure, and has a dull black or greyish colour. Small fragments, when lighted, will burn with flame; hence the term candle or cannel coal. Although this coal is used mostly for gas manufacture, it can be used with advantage in ovens of the side-flue type, or others in which a long flame is desirable.

annel Coal.

Brown coal or lignite is not common in Britain. It consists of the remains of trees or shrubs which have been comparatively recently submerged and pressed into a form of coal. It is brown in colour, and has sometimes a characteristic woody structure. The substance called jet is really a black variety of this brown coal. Brown coal is only a little higher in the scale as a heating agent than peat. There is an earthy brown coal which is very friable, and is sometimes found in layers between the beds of lignite or true brown coal; but this substance differs from a true coal inasmuch as a considerable portion of it is soluble in ether and benzine, and even in alcohol, while a true coal is nearly if not quite insoluble in these substances.

Brown Coal or Lignite.

Peat, or, as it is sometimes called, "turf", is a material which is being constantly formed by the decomposition of marsh plants, chiefly mosses, &c. It also contains nitrogenous compounds, which are the cause of the peculiar smell which it gives off on heating, and it is very rich in ash. The manner in which peat is used for heating ovens has been already described. Except in country villages near peat moors it is not now much used for this purpose.

Peat.

Coke, as used by bakers, is the residue left after all the volatile products have been driven out of it by heat in the retorts in which it is made. It consists essentially of a mass of carbon mixed, of course, with the mineral matter that was in the coal. The quality of the coke depends very much on the amount of mineral matter it contains. It is this mineral matter from which clinker is produced, and the tendency to form clinker and its amount are greater the higher the ratio of ash to carbon in the coke. When coke is quite fresh its heating power is greater than after it has been stored some time. This is due to the fact that a sort of slow combustion is going on all the time—part of the carbon of the coke is combined chemically with the oxygen of the air and carbon dioxide is produced, and this carbon has no further heating effect. The gradual oxidation here referred to is, however, so slow that no perceptible heat is produced while it is going on, yet it reduces the heating powers of the coke considerably after a long period.

Coke.

It is a common expedient with ovensmen using coke to wet it well before charging the furnace with it, the object being to make it burn better and brighter. This effect of water is really of a mechanical kind. When there is a good deal absorbed in the coke this very quickly generates steam when the coke is thrown into the furnace, and the solid coke is partly broken down by the effort of the steam to escape, and the coke therefore exposes a much larger surface to the air passing through the fire while it is burning, and so better combination takes place and the coke burns brightly. But this effect is not produced without some loss of heat, for the water requires a good deal of heat to change it into steam. It will be noted, therefore, that wet coke has not really more heating power than dry coke, but when it starts to burn it burns quicker for the reason stated.

Wet Coke.

It is a mistake to throw coke on a fire in very large pieces, as some men do. The fire has then to do the purely mechanical work of breaking up coke, and some of the heat is used up in that process, and is therefore not available for its own proper work of heating the oven. In addition, large pieces of coke do not give nearly so much heat as small pieces. If quite dry they do not break down readily, and when they burn as large pieces it is only the outside surface that burns, and this is a comparatively small surface in relation to the total bulk of the solid matter. The most efficient coke fire is made by using the coke in small pieces of uniform size.

Small Pieces of Coke Best.

Reference has already been made to the method of burning coke in Scotch and in certain types of externally-heated ovens in which economy is secured by effecting combustion at two stages, instead of completing it in the furnace proper. In this method the air supply is insufficient under the fire, but is augmented by a supply over it, so that the first stage consists in some part of converting the coke into carbon monoxide, and this substance burns with a long pale-blue flame above the fire, thus projecting the point of maximum heat a considerable distance from the furnace proper. This system is not suitable, however, for ovens of the steam-pipe class if the ends of the pipes are actually in the furnace, as there the maximum heat is more effective if in the furnace proper. But whatever kind of oven is being heated there is an economical and a wasteful method of using the fuel. Thus it is wasteful if the quantity of fuel is greater than the air space between the bars will supply draught for—that is, if the fire is too large—unless there is an air supply above the fire to burn the inflammable gas produced. It is wasteful in the case of steam-pipe ovens when you have too quick a draught; when there is a small fire and too much draught; when the fire is allowed to burn low and then a large charge of fresh fuel is piled on; and when the coke is used in large lumps. On the other hand, economy is obtained when the draught is nicely regulated to the size and condition of the fire; when the fire is kept very bright; when it is not allowed to burn into holes or to burn too low before fresh charges of coke are added. If a record is carefully kept of the amount of coke used per day on an oven before any goods are baked in it, this matter of the economical use of the fuel will be easily demonstrated. It is quite a common occurrence in the bakery for a much larger quantity of fuel to be used than is necessary and larger than the equivalent heat obtained. The table on p. 312, taken from a published lecture of the writer, illustrates this point.

Economical Use of Coke.

The heat ratio to fuel for this same oven on other occasions has been as high as 4° F. per lb. of coke used, but the tabulated figures here given show how variable the results may be. How variable they are in everyday bakehouse practice is not generally known, as detailed records of firing are seldom kept so accurately as they should be. It is not enough that the cost of fuel week by week and month by month be ascertained, but the quantity used each day, with the increase of heat obtained

Firing Records.

Heating Tests on Steam-Pipe Oven

	Oven Heated from Temperature.	To Temperature.	In Hours.	∴ Through Temperature.	Quantity of Coke Used.	Ratio of Rise in Temperature per lb. of Coke.
	Fahr.	Fahr.		Fahr.	Lb.	Fahr. deg. per lb.
1	375°	465°	5	90°	55	1·63°
2	375°	480°	6	105°	42½	2·5°
3	350°	435°	4	85°	64	1·32°
4	305°	420°	4	115°	47	2·5°
5	370°	435°	4	65°	75	·87°
6	390°	440°	5	50°	42	1·2°

from its burning. On the weekly or monthly record several days of economical firing within the period may be sufficient to compensate for other days of wasteful work, and so the average for the whole period may be quite good. But a daily account, which is not difficult to keep, shows the ovensman as well as the employer that the good firing may be as easily repeated as the bad, and in consequence greater care is likely to be exercised, to the advantage of everyone except the coke merchant.

Heating of Ovens by Gas.

Coke and coal being solid substances, the lumps variable in size, and the furnace and expedients for catching the heat being difficult to regulate, there have been many attempts made within the last few years to apply gaseous fuel for oven-heating purposes. Ordinary coal gas has long been in use in small ovens, the gas being burned practically in the oven chamber in the ordinary atmospheric burners, which consist essentially of perforated pipes open at one end for the admission of air, which mixes with the gas before it ignites and ensures its complete combustion. This is, of course, the most economical method of burning gas for heating purposes, and but for cost there is no reason why ordinary gas could not be used to heat large ovens, even those of the steam-pipe sort. The obvious advantages of burning gas for oven-heating instead of solid fuel are its cleanness, the ease with which it can be regulated, and the absence of waste in the starting and residual fires.

Producer Gas.

Several systems of gas-manufacturing plants have been designed and applied to the heating of steam-pipe ovens, but they have not all been successful. The special apparatus for gas production is called a "producer plant", and the gas manufactured "producer gas". These plants have long been in use for power purposes, but for oven-heating they are comparatively new. The apparatus consists of a cylindrical receptacle with thick insulated walls, but closed at the top except for gas outlets, and only partly open at the bottom, or only having pipes to provide a limited air supply. When the apparatus is to be used, a fire is lit at the bottom, generally with coal, and then the cylinder is filled up to a depth of 2 or 3 ft. with coke similar to that in ordinary use by the baker. The whole mass of fuel becomes highly heated, but the

air supply from the bottom is kept purposely deficient; the result is that the carbon of the coke burns in a supply only sufficient to form carbon monoxide, and as there is no air at the top of the fire to allow this gas to burn it is collected as a gas in a receiver, and from there conveyed by pipes to special burners underneath the ends of the steam pipes in the oven furnace. The working of the producer plant is practically automatic, requiring no attention except to see that a sufficient supply of coke is maintained. There are no mechanical appliances connected with it. It needs to be charged with fuel only once in eight or nine hours, and then only needs to be observed from time to time to prevent the fire from burning into holes or from being choked with clinker. One successful oven plant of this kind known to the writer can be kept alight for days if not required, and the generation of gas can be stopped by simply cutting off the air supply. There is no storage tank or purifying apparatus attached beyond that in the producer itself: the gas is led straight into the oven in which it is to be burned.

In the special producer referred to above, which is really a modified form of producer and water-gas plant, the air supply which keeps the fire going is heated before it enters the generator, and an automatic arrangement also supplies a small quantity of water vapour which passes through the fire along with the air and is broken up into its constituents, the resultant producer gas therefore containing a quantity of free hydrogen which has a very high heating power. The gas from the producer is conveyed by a pipe to the combustion chamber (oven furnace), where it issues in a thin film under the end of each steam pipe. At the same time it is mixed with air also in a thin film, but the latter is previously heated by passing through a pipe located in the oven flue. The air and gas impinging on each other are intimately mixed, and being lighted by an electric spark or otherwise the mixture burns with a pale-blue flame producing much heat. The special burner is so arranged that the flame nearly envelops the ends of the pipes, and passes along the row of pipes, parting with its heat on the passage before it finally reaches the flue. Each oven or each separate row of pipes can have a series of burners for itself. As gas and air are both gaseous they are easily mixed, and the combustion is more complete than is the case with solid fuel; then, as the area of the oven pipes is small they can be more effectively heated with gas than with the flame of undistributed gases from an ordinary fire.

Water-Gas Plant.

Producer gas proper consists essentially of carbon monoxide (CO), but all kinds of modifications have been made for the admixture of hydrogen from water vapour or steam, which mixture in its extreme quantities is the basis of what has been called "water gas". We shall try to explain the difference in the two kinds of gas. A water-gas plant, like the other described, consists of an iron cylinder jacketed and insulated. This is filled to a depth of 3 or 4 ft. with bituminous coal or with coke, which is lighted at the bottom as in a producer apparatus. There is no air supply to keep the fire burning, except through

Producer Gas and Water Gas Compared.

a pipe connected with a pressure boiler. From this a mixture of steam and air is injected into the producer. In some types the steam and air are not injected together. The air is forced in first until the whole of the contained coke is raised to a white heat; the air supply is then shut off, and steam under pressure and in a finely divided state is injected through the mass of white-hot coke. In these circumstances the steam is dissociated into its elements oxygen and hydrogen, the oxygen of the water or steam forming carbon monoxide with the carbon of the coke, while the hydrogen of the steam remains a free gas. The water gas can then be collected as it comes from the producer, and consists of a mixture of carbon monoxide and hydrogen, which mixture has a very high calorific value. This cycle of air and steam blasts is continued at regular intervals. The difference between this system and the producer system first mentioned is in the nature of the gas mixture, and the necessity for some form of mechanical power in connection with the former to open and shut valves, and to supply the alternate blasts of air and steam. The high heating value of water gas would make it quite suitable for oven-heating, but the elaboration of plant necessary and the machinery parts add so much to the expense and the cost of attendance, that the automatic arrangement first described is likely always to find more favour in connection with bakers' ovens, especially as ordinary producers can be made for very small requirements.

Liquid Fuel.

Except in the case of the "Hotso" oven, already noticed, the writer has not heard of liquid fuel being used for heating ovens, but there does not seem to be any difficulty except cost in its use with ovens of the steam-pipe sort.

Electric Heating.

It may be worth noting here that in connection with small experimental baking plants attached to some large flour mills, the heating power of the ovens is electricity. The baking chamber is surrounded with a coil of high resistance which can be heated to any temperature at once, and baking operations can be conducted at any time desired. The adaptability of the oven for immediate use at any time is compensation, in the circumstances of the miller's bakery, for the high initial and maintenance cost, but under present conditions these costs prohibit the use of such a system of heating in ordinary commercial bakeries.

Draught.

A chapter on fuels and oven-heating would hardly be complete without a few notes on draught, the conditions that hinder and those which favour it. There are certain points about draughts that nearly everyone knows, although not everyone knows their explanation. Thus it is well known that a close fire burns better and easier than an open one; that a fire burns better on a very cold day than on a warm close one; that the draught is poor when a fire is newly lit; that when there is a separate chimney to each fire, particularly to each oven fire, the draught is better than when many flues enter one chimney; that a high chimney, other things equal, gives a better draught than a low one. Before dealing with these specific points it may be as well to explain exactly what causes a draught at all. The draught in a chimney is the result of the hot air in

the chimney being much lighter, bulk for bulk, than a column of the same area and height of the cold air outside the chimney. To understand the principle of the matter, imagine the chimney to be one arm of a great U tube, the other arm being an imaginary stack of the same height as the chimney, but filled with air at the temperature of the atmosphere. The cold air balances or overbalances the hot air in the chimney, and pushes it upwards, because the whole weight of the latter is so much lighter than the whole weight of the former. Then as air or any gas becomes lighter the hotter it is, so the hotter the air in the chimney is the lighter it is compared with the outside air and the stronger push the latter exercises on it—in other words, the draught becomes stronger. This explains why the draught is so much better in connection with a close as compared with an open fire, because in the former the products of combustion are hot and pass up the chimney alone, while in the latter they are mixed with much cold air, and are therefore cooler. This also accounts for the better draught on a cold day than on a warm one, because on the former the outside air is colder, and therefore heavier than on the latter, and therefore its overbalancing effect is greater, that is, the draught is greater. The coldness and therefore heaviness of the air in the chimney when a fire is newly lit accounts for the poor draught at that stage. But it should be particularly noticed that it is not the absolute but the relative weight of the air column that is the essential in draught production. Thus a tall chimney gives a better draught than a low one, because the relative difference in weight between two tall columns of hot and cold air is much greater than the differences in weight between two short columns at the same temperatures. The bad effects following the impact of several flues into one chimney are due to the fact that a stream of hot air entering the chimney from the highest up flue has a certain "way" on it, and from its opening may flow across to the opposite wall of the chimney to that at which it enters before it takes a direction upwards, and to some extent may act as a damper to the currents from the other flues, particularly if the products of combustion from any of these are colder and heavier. The use of chimney pots on the top of chimneys as draught improvers is to prevent the undue expansion and cooling of the upward current of hot air; the narrowing of built chimneys is for the same purpose. Cowls and other expedients are to prevent down draughts of cold air, which have both a cooling and retarding influence on the upward currents. Yet it is obviously not good policy to allow the hot products from an oven furnace to enter the chimney very hot, as they are past their work of heating the oven then; hence the economy of slow-combustion furnaces and other expedients which do not require a quick draught as long as it is sufficient. It is better, therefore, in connection with oven-heating to adopt all contrivances that will conserve heat in the chimney, and all contrivances that will ensure complete combustion of fuel and its economical use, than to obtain draught by letting much of the heat pass up unused.

CHAPTER LI

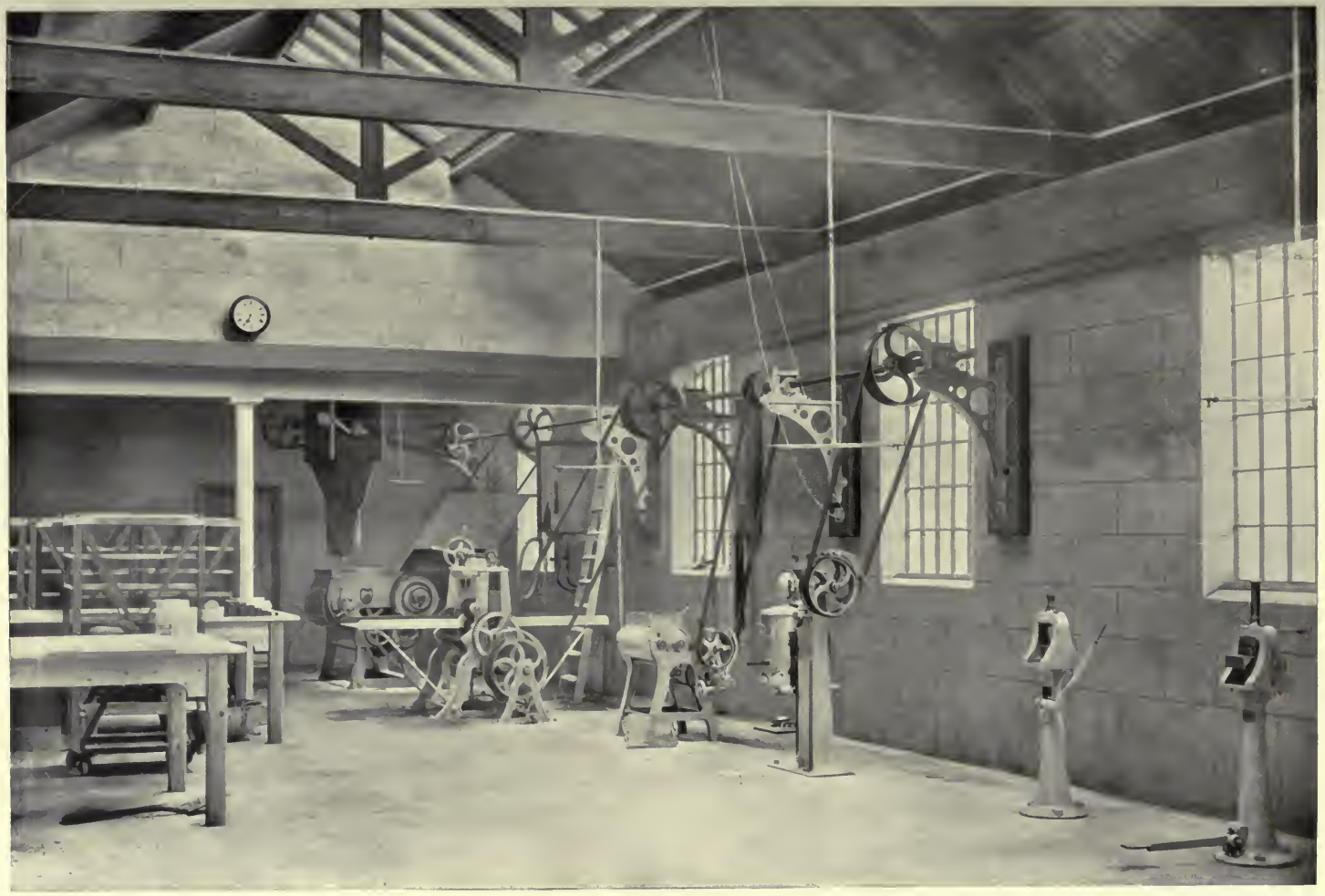
MACHINERY IN THE BAKERY

We are now so familiar with machinery of all kinds in the bakery that it is difficult to realize that in 1860 machinery for bread-making or confectionery was something of a marvel, whilst ten years earlier it was non-existent. This last statement may need qualifying in a certain sense, because there were many efforts made, as the patent records show, to apply mechanical agencies to mixing and kneading dough, but these were not adopted in a commercial way by the trade, probably because their effectiveness was not sufficiently demonstrated by their inventors; because the baking trade of that day was in the hands of small bakers for the most part; and because there were no small and cheap power agencies like gas or oil engines or electric motors, and if power was needed it had to be wind or water or steam, and either of these implied much initial expense and larger operations than the great majority of bakers could contemplate. It has been confidently asserted that the first dough-making machines for hand power originally were in use in Glasgow about 1850, but there are no very reliable data on this point. In 1853 a Mr. Deacon, of 11 Chester Street, Kennington Lane, London, was the only baker in that city then using a machine for dough-making. This was the invention of M. Rolland, a French baker, who was also the inventor of the original type of oven already mentioned as the Rotary. This machine also was hand-driven. It was undoubtedly in Glasgow that machinery was first used on a large scale, the type of machine being that in which the mixing parts are like the thick blades of knives working on a frame, and with sets passing each other in opposite directions.

Introduction of Machinery into the Bakery.

The growth of bread factories has been the immediate and inevitable result of the adoption of machinery in both bread and small goods departments, and bakers in a small way of business have been not unnaturally alarmed, and think that these factories are likely to destroy their trades entirely. This view is probably a wrong one, or at least may readily be made so if the small bakers will only exert themselves to follow the stricter economies and correct business methods of the factories, instead of continuing the loose and haphazard methods that too often prevail in the small bakery. It is the method of the large establishment rather than its machinery that gives it the advantage over the small bakery. The only part of the bread-making process in which machinery can effect any considerable saving in cost of labour is in connection with mixing and other processes in the manipulation of the loaves, but bread is one of those commodities in which the cost of labour of manufacture is relatively small in any case. Even in a comparatively small bakery it may not be more than 2*s.* 6*d.* per sack (280 lb.) of flour, while in

Growth of Large Factories.



CORNER OF RESTAURANT BAKERY

the largest factory, with almost automatic plant, it may be as much as 1s. 6d. per sack, and can in the present state of machinery development be hardly less than 1s. per sack. This lowest estimate gives the factory an apparent advantage of 1s. 6d. per sack, which may be augmented by the advantage a large firm has in buying flour, &c., in considerable quantities. But whether the large firm distributes wholesale or retail, the cost for distribution is always much higher than the proportionate costs in the smaller business. The latter distributes its bread, &c., in a narrow area surrounding the shop, and in cases uses up the residue labour from the bakery for the purpose, while a good deal of the trade may be actually done over the counter. On the other hand, the factory has to send its bread far from the establishment, and, even in the area served, the customers may be much scattered. These conditions all absorb energy and increase cost of distribution, and this increase over the costs of the small baker for the same department of the business may be considerably greater than the advantage gained by saving in the cost of manufacture. Now that dough-making machines can be obtained at a moderate price and motors may be hired, it is a very small bakery indeed that cannot profitably employ such a machine, and when dough-making is done the most exhausting part of the work is over. The question is very frequently asked whether a trade of fifteen sacks or so is sufficient to warrant the purchase of a dough-making machine. All experience teaches that it does; indeed, in twenty years or so the bakery in which dough is hand-made will be the exception.

Cost of Labour per Sack of Flour.

The prejudice against machines for dough-making is now almost dead but one still hears the assertion made that "machines kill the dough and never make it as good as that made by hand". This idea is based on the fact that hand-made dough does, unless very tight, give signs of fermenting quicker than machine-made dough. This is only because the latter is at first closer in texture and its gluten tougher than that of the former, and until a considerable quantity of gas is produced within the dough it does not so readily become soft and spongy as the other. But in spite of the absence of signs of working the yeast is probably fermenting as quickly in the one case as in the other, and the machine-made dough works quicker at the later stages than the hand-made, and certainly ferments more steadily. The fault ascribed to a machine of "felling" the dough is often an imaginary one because the dough happens to feel solid. There is not any danger of hurting the dough by pressure at the making stage be that ever so severe, while very thorough mixing helps to toughen the gluten and to enable it to become better hydrated (to absorb more water), and the quantity of dough is in consequence increased. One kind of fermentation-retarding effect the machine may have is in considerably reducing the temperature of the dough below the point at which the yeast works satisfactorily. In ordinary circumstances this cooling effect can be duly allowed for by keeping up the temperature of the water, but in very cold weather there is some difficulty about this. It is better, therefore, that the dough should be kept in the machine as short a time as possible

Machine-made Dough.

provided that it is thoroughly mixed, especially in cold weather. It is possible, when through any cause the dough is mixed for a long time, it may be cooled so much as to work very slowly and to be still unripe in the time that it is usually quite ready. This warning is not needless, although there are cases in which the dough may be actually left to ripen in the machine altogether, a method sometimes followed by those using a machine called the "Globe". This machine is a large hollow sphere suspended from the ceiling of the bakery, its internal mechanism consisting of large knives that revolve and cut through the dough while mixing it. The capacity of the sphere is considerable enough in some cases to allow five sacks to be mixed at once; therefore if only two sacks are made into dough, there is plenty of room within the machine to allow the dough to prove. As this machine is invariably fixed in the ceiling, the atmosphere surrounding it is warm and the machine itself is also warm. It seems evident that in a moderately warm bakery a machine has neither a "felling" nor a cooling effect on the dough. Were it otherwise the dough would be entirely destroyed in those machines that require to mix it for as long as twenty minutes, the machine working all the time at a high speed—in such a machine, for instance, as the Corby, so extensively used for pan bread in the United States and Canada.

The "Globe" Dough-making Machine.

An opinion prevalent amongst bakers and encouraged by engineers is that the virtue in a machine consists in the speed with which it can make dough: the machine that mixes in six minutes is supposed to be ever so much better than the one taking eight minutes. It is not in the saving of time only that the excellence lies, but it is assumed that the speedy mixer is also the light mixer, and the lightly mixed dough is supposed to be most like that made by hand. There is not much in this contention. Lightness of dough is not everything, and thorough mixing is important. Nor does the quick-mixing machine necessarily save the machineman's time, for if the whole operation is only to occupy four minutes, he is likely to stand at the machine waiting on it; but if the process occupies ten to fourteen minutes, then he may be getting on with some other work while the machine is in operation. As a time-saver only, a dough-making machine to a small baker is not so very important, but as an energy-saver it is. In a trade of from twelve to fifteen sacks, the whole operation of dough-making by hand occupies not more than from one and a half to two hours per day, or a weekly total of from nine to twelve hours. The use of a machine will not entirely remove this time charge. It will still be necessary to "pitch" the flour, measure water, ascertain temperature, weigh yeast, salt, &c., start the machine and attend to it, and attend to the dough when finished. After due allowances are made, the whole time saved is probably not more than five or six hours per week, and as this time is no appreciable proportion of a week's work for a man, it is quite evident that a dough-making machine in a small business of this sort will not allow of a reduction of the staff; all it will do is to relieve the men from the most exhausting part of the day's work, and in

Speed in Dough-making Machines.

consequence improve their capacity for doing the remainder of the work better, and for doing a little more each when occasion arises. This applies also to larger trades of twenty or forty sacks per week. If a trade which nominally requires five men, when hand work is the rule, is assisted by machinery, the staff may then be reduced by one man, so that four men with dough-making machinery only should be able to do as much work as five men without. But it seldom happens that the adoption of machinery entails a reduction of staff; it is usually rather followed by more business and a larger staff. The expense incurred seems to act as a spur to sharpen up the master baker to improve his methods in all directions, and in most cases increased business is the result. To the small master who is his own foreman a dough-making machine sometimes makes all the difference between success and failure. Many a thoroughly good baker has undone himself after starting in business by tying himself too closely to the bakehouse and using up all his energy there, leaving himself neither time nor energy to look after his books and the trading side of his business.

Dough-making Machinery and Labour-saving.

The following general remarks on dough-making machines are taken from a lecture delivered by the writer and published by the National Association of Master Bakers. "I don't think any great advantage can accrue to the baker in the use of a machine driven by hand power. A man is himself a very defective machine, and I cannot see what appliance on a machine will husband his energy, however much it may increase his power. In other words, I don't think a man can make dough by a hand machine with greater ease than he should be able to do without its assistance: if it requires more energy in less time, or less energy at the moment but spread over a much longer time than the ordinary method of making dough, it is equally uneconomical as a machine.

Hand-driven Machines Useless.

"With regard to the power-driven machine, the less complicated it is the better it meets the requirements of the bakery. Its parts should be simple and strong, and as nearly unbreakable as possible. It should be well finished and smooth, and the parts requiring cleaning easily got at. It should not have a centre shaft, nor should the blades be subjected to great leverage when at work; it should not require excessive power to drive it, although the power installed is usually greater than what is absolutely needed. One error in which engineers for some time were involved was in endeavouring to make a machine do too many different operations. They were no doubt driven to this by the demands of bakers, but these demands were evidently conceived in ignorance of the kind of thing a machine is and the purpose for which it is intended. I have repeatedly heard men profess a preference for one machine over another, not because it actually mixed quicker or better, but because it had arms shaped something like a man's and because the motion was also somewhat similar. . . . I should consider this the very poorest recommendation a machine could have. The only thing a mixing machine should do is to mix. If it does this properly in the minimum of

Requirements of a Good Power-driven Machine.

time with the least expenditure of energy, and the least strain and wear, then, other things equal, it is the ideal machine, whatever the shape of its arms or whatever its motion. If it is deficient in any of these essential particulars, then to that extent it is faulty, and the likeness of its arms to those of a man is no saving grace.

"The mixing machine that is required to 'break sponge' as a preliminary to making dough has been provided on the demand of the baker. This requires two speeds on the machine, which necessitates complicated gearing and makes the machine more liable to go wrong in working, without any compensation in improvement in the dough. Because a baker, when he makes his bread on the sponge-and-dough system, has to spend a good part of the time in breaking up sponge in the water before drawing in the flour, it is assumed that dough cannot be right unless the same process is followed in every detail when a machine performs the operation. . . . While it is absolutely necessary that in hand work the greatest care must be exercised in thoroughly breaking up sponge, because if this is not done the subsequent mixing of dough does not properly deal with every particle, and the pieces of sponge may remain as sponge to the end, the same rule does not apply to a machine, simply because it deals with the dough in minute detail, and particles of sponge get stretched and mixed as thoroughly as if they had previously been dissolved in the doughing water. . . . A machine that is a good dough-mixer is very likely to be a bad sponge-breaker, for the double reason that the open-arm arrangement best for sponge-breaking is faulty for the heavier work of dough-making, and that the centrifugal motion imparted to the sponge by quickly revolving arms is not conducive to easy breaking of wet sponge. The sponge is more likely to slip round and over the arms than to be broken up by them; while the disadvantage of having the sponge and water a long time in the machine, probably losing heat all the time, is greater than any advantage that may accrue from having the sponge broken up in the water. But better than all considerations of this kind is the fact that dough made with sponge that is simply placed in the machine with flour and water and other ingredients, and the whole thoroughly mixed together, is in all respects satisfactory dough, ferments freely, and produces a loaf of as even a texture as anyone could desire. This does not, of course, imply that two speeds on a dough machine is a needless elaboration. When both slack and stiff doughs are required for different kinds of bread, it is a decided advantage to have a quick speed for the former and a slow speed for the latter, and the power needed will be about the same in both cases."

Machines that Break Sponge.

When about to choose a machine, the selection should be guided by the number of men available to handle the dough afterwards, and by the oven capacity to bake it, for nothing so readily causes irregularity in the bread as having the batches of dough too big for the oven capacity. The piece left over, whether mixed with the next batch or baked by itself, is always unsatisfactory.

Choice of Dough-mixing Machine.

It is a very bad plan to have large lots of dough made with only a small staff to handle it. A very satisfactory arrangement is to make the doughs equal in every case to the capacity of the oven the loaves are to be baked in. If the staff is large, then the doughs may be made equal in size to the capacity of a series of ovens that can be filled in consecutive order in about one hour.

Methods of Machine Dough-making.

There is little uniformity in methods followed in making doughs in machines. In some establishments the practice is to sift the flour into the machine, then to start it working and let the water run in while it is being mixed. By following this plan there is a danger of stiff pieces of dough being formed which require afterwards to be softened down with the water subsequently added. The opposite method is followed in other bakeries. The water is let into the machine first, then the flour is sifted on top of it. This plan is likely to be less troublesome than the other, because the dough is mixed first into a soft paste, becoming of gradually increasing stiffness as the flour is sifted in. This method produces a smooth, well-mixed dough. Care has to be taken, however, that the machine does not cool the water overmuch before it is mixed into dough, as it readily may if the mixing is delayed in any way. The most satisfactory method is to sift flour first into the machine, then to run in all the water and all the other ingredients before the mixing is started, and then to mix all at once.

Cost of Machinery.

The competition amongst engineers has now become so keen that a serviceable installation of machinery suitable for a trade of forty sacks, and with a cake and sponge machine, can be procured for about £200, and the probability is that bakers will soon be able to obtain machines on hire or on the hire-purchase system. The running expenses of such a plant, working up to full capacity, would probably not be more than 10*s.* a week. When the baker has decided to obtain machinery, his great difficulty is in making a selection from amongst the many varieties of machines he is offered. The most familiar type now on the market is the machine patented about 1885 by Mr. Paul Pfleiderer, and called by his firm the "Universal" because it has been adapted for mixing all sorts of ingredients besides bread (see figs. 217 and 218). It is sold in various forms for mixing pills, cordite, rubber, cement, &c. It seems to be equally effective for all purposes, whether the ingredients are wet or dry, soft or tough. Its original purpose, however, was that of a dough-mixing machine, and it very early established itself as a thoroughly efficient appliance, although its comparatively high cost on account of its substantiality prevented its adoption by the smaller bakers. As the patents for this machine have run out for several years, it has been very largely copied by other makers. The main points of this machine are that it consists of two cast ends, round which a sheet-iron half-drum is riveted. The internal mechanism consists of two blades twisted **Z**-shape at varying angles,

The "Universal" Dough-mixer.

but made so that as they revolve they are close to the interior of the drum, carrying the dough round with them, and cutting and pressing it between them as they meet in the centre of the drum, or shearing it between them and a ridge in the centre, which really acts as a third blade. The bends on the blades are of different lengths and they are geared to run at different speeds. The effect of these conditions is to shift the mass of dough backward and forward in the machine and to carry it as well from one end to the other until the mixing is thoroughly done. This machine works slowly, yet a dough is very efficiently mixed in from eight to fourteen minutes according to its size. A machine on the same principle is made with only one blade for small doughs. In this case the sides of the drum act as the holding surface, against which the single blade cuts and mixes the dough. The power is applied to the machine by two pulleys, one with a straight the other with a crossed belt. Either can be made fast to the working parts by means of a friction clutch, so that the machine can be run forward or reversed. This arrangement is extremely useful and expedites the mixing. Thus, after the machine has been running forward for some time, the blades may retain around them some dry flour which is carried round without mixing. The blades are immediately cleared when they are reversed, and the previously imprisoned flour is scattered over the dough and thoroughly incorporated. On account of the blades of this machine being broad and blunt, it has been suggested, wholly on theoretical grounds, that it is likely to "fell" or unduly solidify the dough; but in practice, as the writer can vouch from a lengthy experience, there is no damage whatever done to the dough. Although, for the reason already given, it takes a little time after dough is made before it shows active signs of working, yet the fermentation is proceeding all the same, and the dough afterwards becomes free enough and produces bright-looking loaves with a fine texture. All sorts of variations have been introduced in the shape of the arms of the machine and in their mode of motion, but there is nothing quite dis-

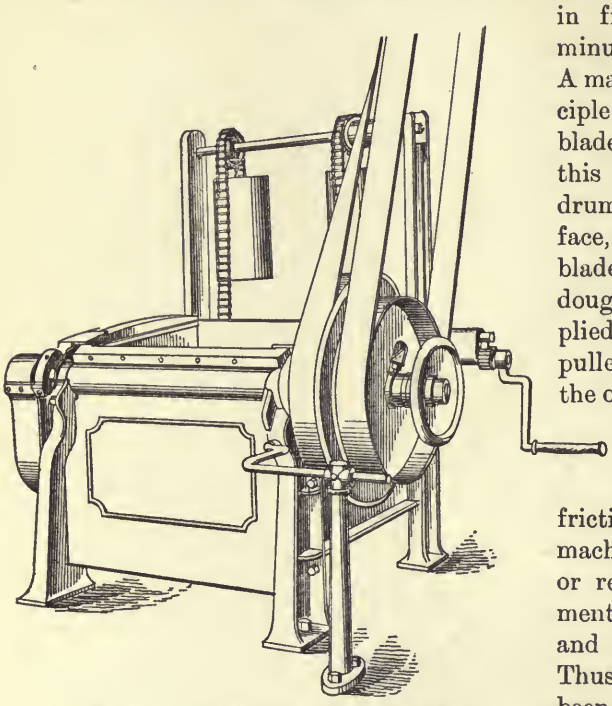
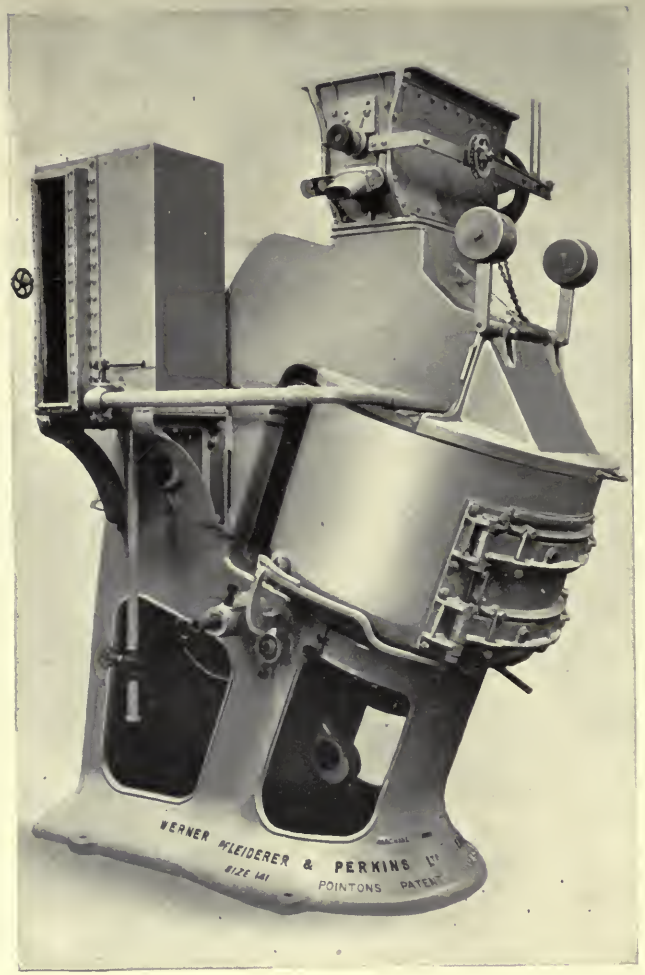
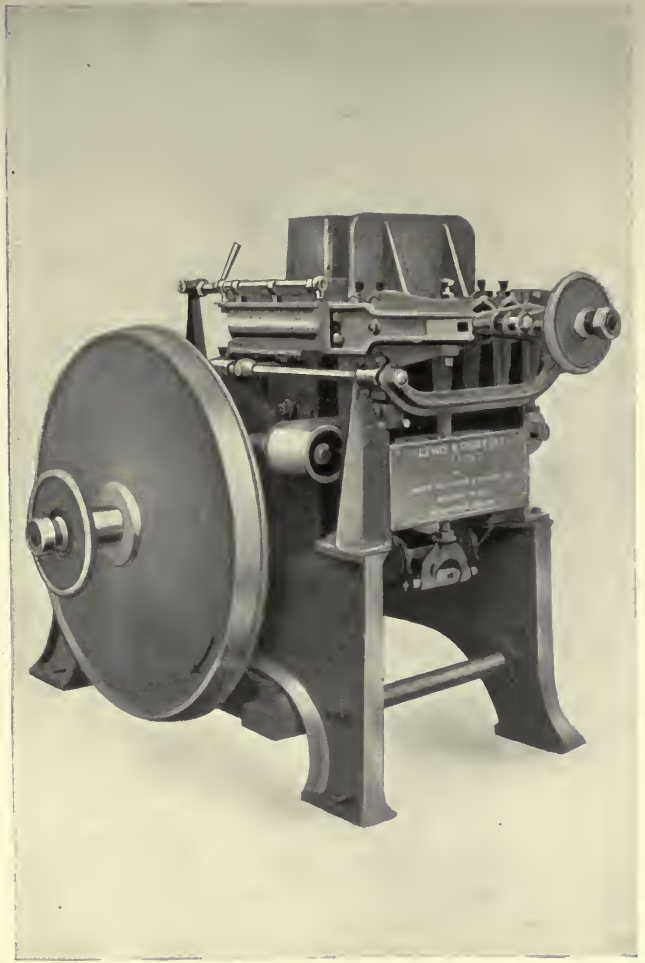


Fig. 217.—"Universal" Dough-kneading Machine



"VIENNARA" KNEADER, WITH SIFTER AND TEMPERING TANK



FOUR-CYLINDER DOUGH-DIVIDING MACHINE

tinctive in the principle of any of the machines to warrant special notice.

Quite recently a machine on a new principle has been introduced called the "Viennara" (see Plate). This is a cylindrical machine fixed at an angle, and with one strong arm with a sort of branched or forked head. The drum or cylinder of the machine revolves while the dough is making, and at the same time the arm plunges down into the mixture and then lifts or pulls a portion of it upwards and folds it over; the double action of revolving drum and the lifting arm ensures that every portion of the dough is thoroughly mixed and toughened. The toughening part of the process is so complete that on account of it a much larger quantity of water is required to hydrate the gluten of the flour, and the yield of bread is in consequence much increased. The patentees of this machine claim that the increased yield and improved texture and appearance produced by the action of this machine are advantages so great as to make it worth while for the baker to take out one of the older type of machines and install one of the Viennara. There are several other types of machines consisting of a pan or drum that revolves with one or more arms moving upwards and downwards through the dough to mix it, but in principle there is little difference between them and the machine just described in some detail.

The "Viennara" Machine.

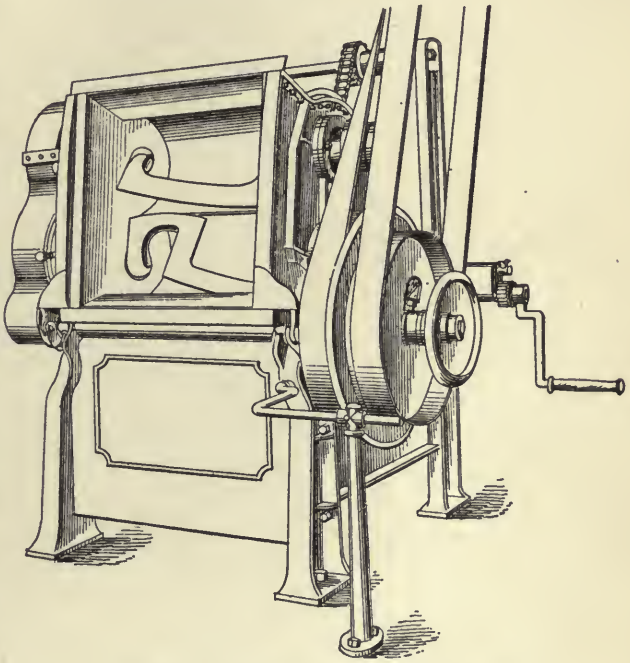


Fig. 218.—"Universal" Kneading Machine, Tilted

In Germany, Belgium, and the United States there is a dough-making machine in considerable favour, which consists of an ordinary movable iron trough with a round bottom, into which a revolving arm can be turned. This arm revolves slowly through the dough mixture from one end of the trough to the other, backwards and forwards, until the dough is thoroughly mixed. When this is accomplished, the trough part of the machine can be turned away for the dough to prove, and another empty trough placed in position under the arm for

German Dough-making Machine.

another dough to be made. Fig. 219 shows this machine, with the trough part moved out of the position it occupies when dough is being made.

The dough-making machine which has within the last few years found most favour amongst small bakers is what is known as the Drum machine.

The Drum Dough-making Machine.

This was originally the invention of an Irish baker, Mr. Adair, and consisted in its original form of a large round drum fixed at one end of a strong arm or shaft, but without any movable arms internally. The ultimate developments in this machine consisted in having two cast-iron ends to the machine with spindles, and these supported on A-shaped legs. The doors, of which there are two, are

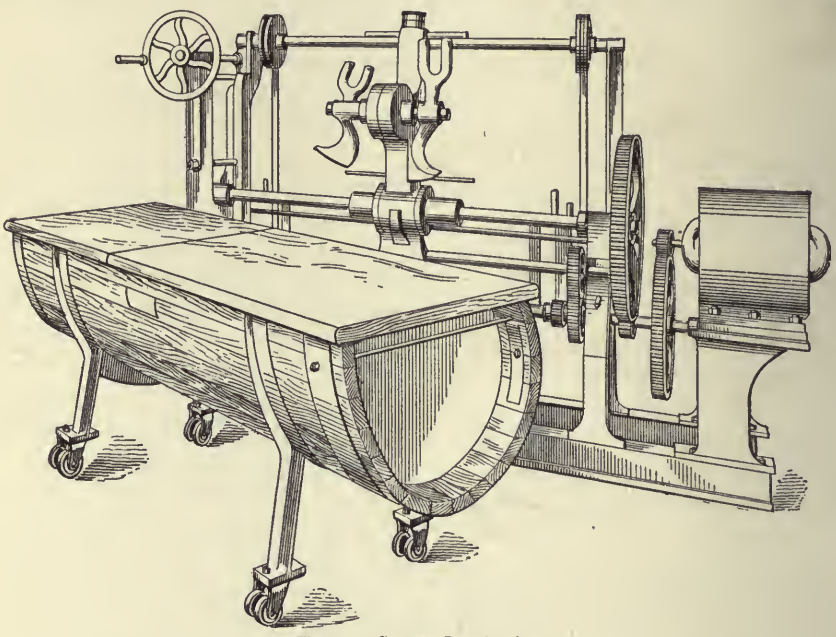


Fig. 219.—German Dough-mixer

fixed on the circumference, and are made water-tight with indiarubber packing between the door and the openings. In the interior there are no moving parts whatever, but three, four, or more iron rods are bolted across the machine, and across these the dough is cut or broken as it is carried round by the machine. The revolutions of the machine are very slow, about fourteen in a minute, and at each revolution, as the dough mixture is carried to the top of the machine, it drops across the rods; and as this operation is repeated over and over again, a complete admixture of all the parts takes place. In some machines, instead of single rods fixed across the machine, movable grids are used. The effects are similar to those obtained with rods only, and it is doubtful if the alteration to grids is any improvement. Those who are unfamiliar with this type of machine have an idea, evidently because the doors are comparatively small, that the machine is difficult to clean. The writer is practically familiar

with this machine, and can assert that it is really easier to clean than a machine with arms. The dough can be made perfectly in this machine, but one of the drawbacks attached to its use is the difficulty of examining the dough from time to time as it is being made. This, however, is not wholly a disadvantage, since it forces the baker for his own sake to calculate nicely the quantity of flour and water he should use for each dough, and makes him also very careful in his weighings and measurements. Fig. 220 shows a modern drum machine with internal grids and a patent clutch to start and stop the machine.

Up to about a dozen years ago the whole machinery in even a large bread bakery consisted of one or two dough machines with tempering tank attached for water and sifter for flour. In Scottish bakeries there may have been a dough brake and a sponge-stirrer also. The next development was in the matter of bread-dividers. The first type of divider was on the same principle as the older and familiar bun-divider. A weighed quantity of dough is spread in a square iron box; a presser or plunger descends and presses the dough and spreads it to fill the box; then knives descend through the presser and cut the dough into an equal number of pieces of the same size. There are still a few of those machines in large bakeries, and with care they give moderately good results. There are now, however, several types of loaf-dividing machines on the market. The general principle governing all of them is that the dough is measured rather than weighed. The dough by means of plungers is pressed into receptacles, a given thickness of dough presumably weighing a given amount. In practice these machines turn out pieces extremely near the proper weight, and with almost perfect regularity. For dough of any stiffness the length of aperture for the measurement of the dough is determined by a screw gauge, but if the stiffness of the dough is altered it may be necessary to alter the gauge slightly to suit the alteration in the gravity of the dough. These slight alterations can be adjusted very easily, even when the machine is working. The same sort of adjustments must be made when the weights of the loaves are altered. In all these machines the dough is measured—not weighed—in a box or cylinder, and ejected from it by a plunger which fits quite close but free. In some types of machines the cylinders are comparatively long and with a diameter about 4 in.; in others the cylinders are larger in diameter—about 6 in.—and of course much shallower. In the original divider

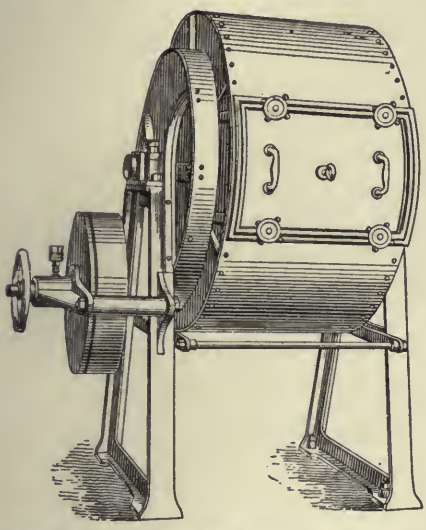


Fig. 220.—Hawkins Rotary Dough-making Machine

Bread-dividers.

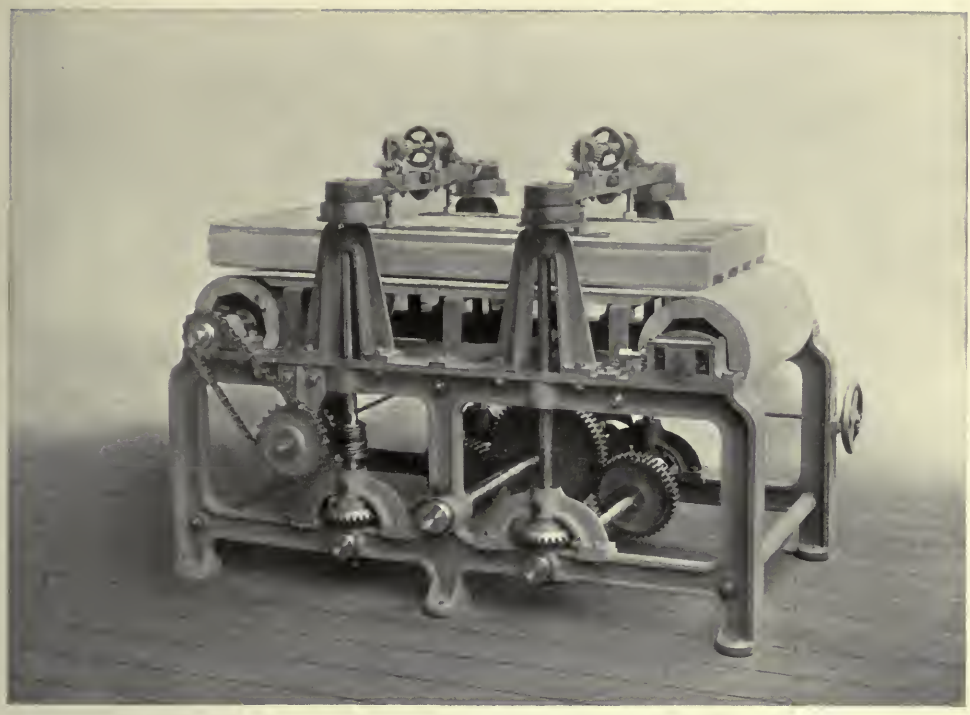
a receptacle at the bottom of the hopper is filled with dough by the weight of the latter only; then a knife-edged plate cuts off the dough in the hopper, and an accurately fitted plunger pushes the dough in the receptacle underneath into the measuring boxes, the plungers of which recede before the dough until they reach the stops, which are fixed in position by the gauge already referred to. The frame containing the boxes with the measured dough then descends, and a cross arm pushes the plungers until they are flush with the inner ends of the boxes, the pieces of dough being dropped on to a band which conveys them on to or along the table. Once the machine is nicely adjusted, the pieces of dough are very uniform in weight. One difficulty that sometimes arises is when any slight obstruction occurs in the measuring boxes. The plunger is so accurately fitted that a very little piece of hard dough is sufficient to cause it to stick, with the result that the loaves from that particular box may be more or less short weight. The plunger which first clears the receptacle under the hopper is not fixed to any rigid arm of the machine, but the pressure to which the dough is subjected is determined by a weight, or rather a box of weights, hung on the lever that works the plunger referred to. The idea is to subject the dough to sufficient pressure only to fill the measuring boxes and no more, that the dough may not be "felled" or damaged in any way by excessive pressure.

The Original Dough-divider.

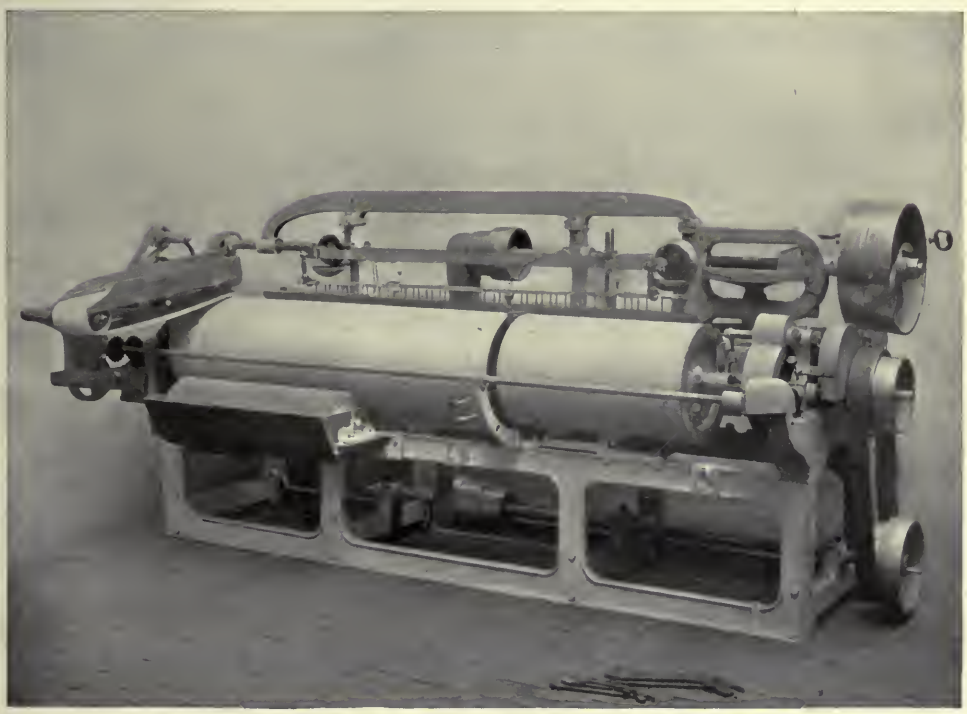
In another type of machine the box under the hopper is cleared and the measuring boxes filled by a conveyor screw which pushes the dough forward; but here again the screw conveyor does not exert a rigid pressure, but only sufficient to fill the boxes, because it is fixed at the end on two spiral springs, and according as these are adjusted to be very open or close, the pressure they exert will be very gentle or very hard. In one type of machine the measuring boxes are in the circumference of an iron drum, the pressure on the dough to fill these boxes being exerted by rollers. In some machines the boxes are necessarily kept clean only, and to prevent rust have to be thoroughly cleaned and greased after each time of using; in other machines an automatic lubricating arrangement is attached to the measuring boxes, so that a thin film of oil is spread over them to prevent the dough sticking. In spite of all expedients there is some difficulty in getting these machines to work satisfactorily with very soft doughs. The machines have been accused of "felling" the dough, and it does seem to require more time to recover after being through such a machine than when handed up in the ordinary way. But although the writer has had practical experience of several types of dividers he has not found any permanent injury to the dough from their use, although mistakes in adjustment of the weights, or of the pressure springs, sometimes produce excessive pressure that makes the dough feel dead for a time; but a reduction in weight to actual needs, or opening the springs, is sufficient in either case to effect the desired remedy.

Other Types of Dividers.

The latest development in connection with dividers is to attach directly to them an arrangement for "handing up" the loaves and delivering them



"UNITED" BUN-MOULDER



CALLOW-BAKER DOUGH-MOULDING MACHINE

MOULDING MACHINERY

quite round, ready for boarding or for the prover. This hander-up consists essentially of a wheel with a deep groove in which the pieces of dough run, pressing against a band of felt or other material. When dividers were first adopted the accepted idea was that a short time should elapse after the loaves were divided, before they should be "handed up"; but now it is recognized that the time to allow for recovery is between the handing up and the moulding stage. In some systems the "handing-up" machine is quite distinct from the divider, but the latter delivers its pieces directly on to the former. One of the first and best-known type of handing-up and moulding machines is shown in fig. 221. This consists of a wide metal corrugated cone which revolves, and there are fixed above it metal channels or troughs held in position by springs, the tension of which can be increased or relieved as desired. The pieces of dough enter these channels near the outside edge of the cone, and as the latter revolves they are carried forward and upward by the aid of the corrugations and the surface of the covers, and in the passage are rendered round and smooth. As the covers are not rigid, but yield on account of the springs to the pressure of the dough underneath, that dough is not unduly pressed nor its skin torn. In the early machines of this type each size of loaf had to have a special size of cover adjusted for its moulding, the separate covers being taken off or fixed on the machine as needed. Pointon's new flexible moulder has no large cone table, but instead has a wide rubber and canvas band whose parallel axes are inclined from the horizontal. The moulding troughs are arranged on this band diagonally, and by shifting the angle of the band, or opening or closing the trough by hand wheels, small and large pieces can be moulded without the use of different troughs.

Handing-up Machines.

Handing-up and Moulding Machine.

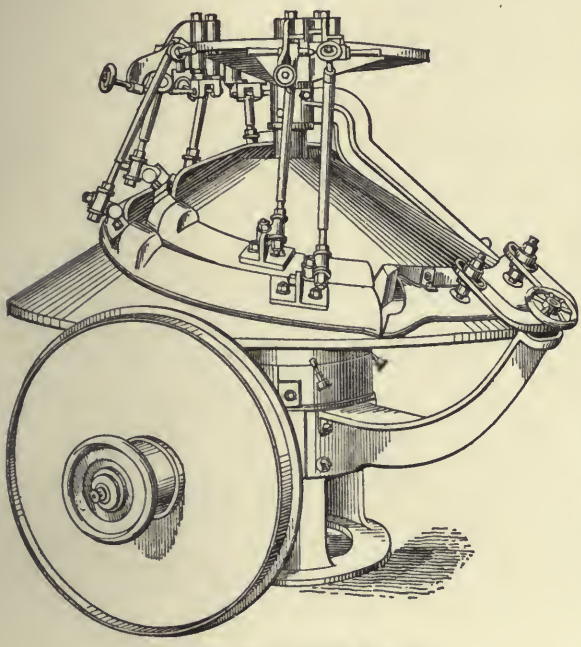


Fig. 221.—Bread-moulding Machine

Another type of moulding machine that has proved its efficiency practically is that known as the Callow-Baker moulding machine. In this machine, contact of the dough with a metal surface is carefully avoided, felt and wood being the moulding surfaces,

Callow-Baker Moulding Machine.

so as to prevent cooling as much as possible. By an ingenious conjunction of the movements of felt-covered rollers of large diameter, of a conveyor band, and the intermittent but gentle impact of a long wooden beam, the pieces of dough are conveyed along a hollowed-out channel, and are finished as nearly the same shape as if they had been handed up or moulded by hand. This machine (see Plate MOULDING MACHINERY) can be adapted by a slight alteration of the parts to mould loaves of a round shape or long loaves to be baked in tins. In both types of moulders described, the texture of the bread is more uniform than is generally obtained by hand work.

A machine specially intended for moulding tin or long loaves is shown

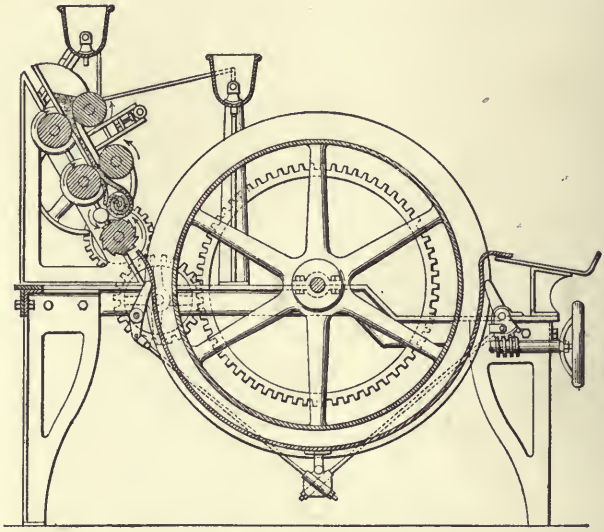
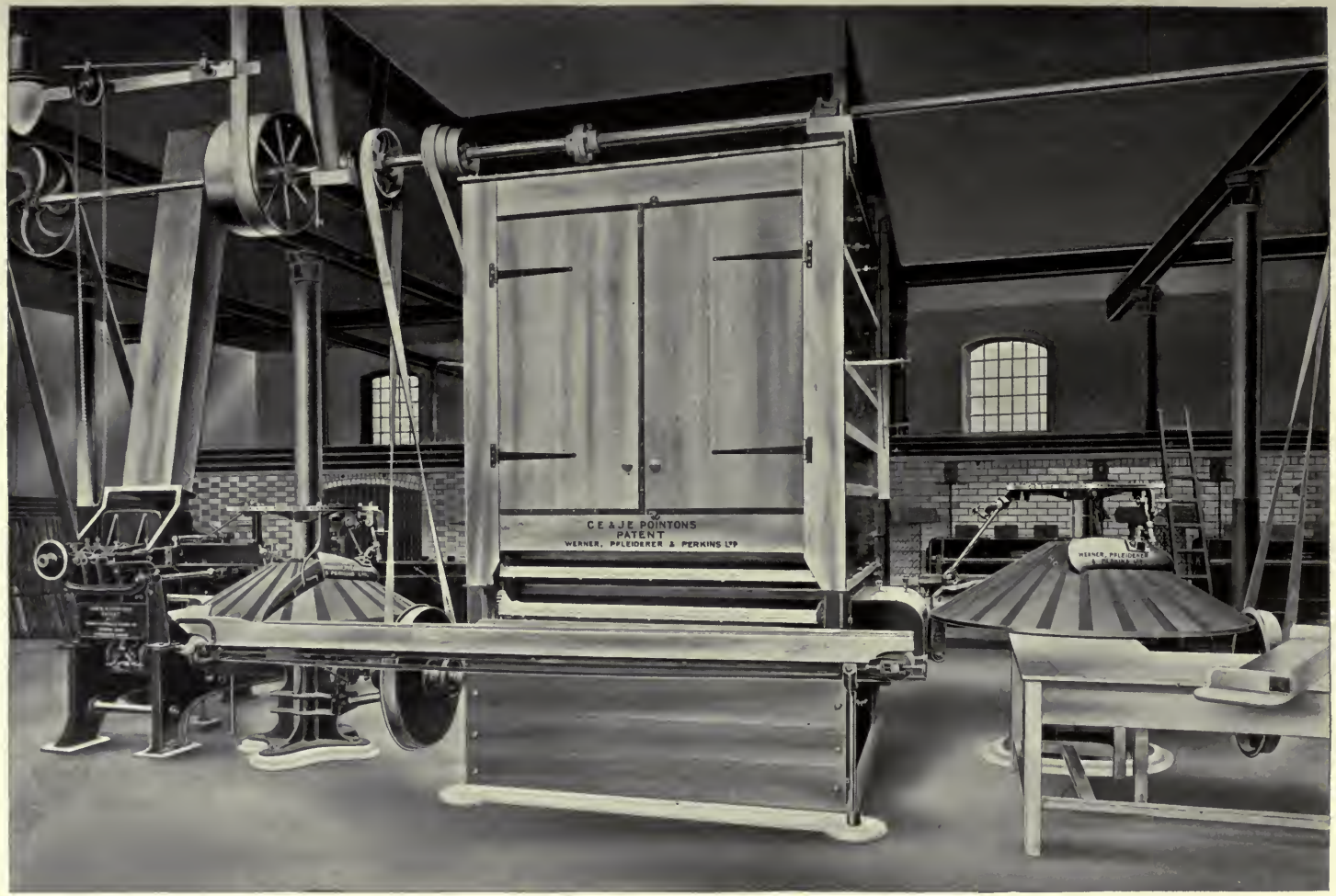


Fig. 222.—American Moulder

in sectional elevation in fig. 222. In this machine the piece of dough is first conveyed between series of rollers and drawn out into a long band of dough of uniform thickness; then as it is carried forward in the machine, this band is rolled up quite gently but firmly, and delivered directly into the tin placed in position to receive it. This machine is more common in America than in Britain, but the writer has had some experience of its work, and can vouch for its efficiency as a moulder of soft dough, producing loaves of quite remarkable evenness of texture. One of the newest moulding machines, either for rolls or large bread of round shape, is called the "United". (See Plate MOULDING MACHINERY.) The essential parts in this machine are a broad band the full width of the machine moving continuously in one direction, and a cover consisting of straight, deep, semicircular channels. The pieces of dough enter by holes in the top of the cover, and are carried along the channels by the forward motion

Moulding Machine for Long Tin Loaves.

The "United" Moulding Machine.



COMPLETE AUTOMATIC BREAD-MAKING PLANT

(Werner, Pfleiderer, & Perkins, Ltd.)

of the band and the lateral rotary motion of the whole cover, which joint motions mould the pieces into a round shape and deliver them at the end of the machine. The moulding surfaces of this machine are either felt or wood, to prevent undue cooling of the dough. The amount of pressure to which the dough is to be subjected can be properly adjusted by raising or lowering the cover, and the same adjustment can be easily made to suit the different sizes of pieces to be moulded. The writer has had no practical experience with this machine, but is informed by those who have that it produces excellent results in the matter of fineness of skin, as well as of evenness of texture.

Room for Invention.

The ideal of the factory baker and of the bakery engineer is to produce a combination of machines that will make bread almost without any handling of the dough. The series of mechanical contrivances has not yet been provided, although one difficulty after another has within recent years been overcome. Something is still needed in place of the very oldfashioned method of tipping dough into a wooden truck, allowing it to prove there, then cutting it out into small pieces at a time, and lifting it by hand into the hopper of a dividing machine. Some improvement is also needed towards making the setting of the bread in the oven more of a mechanical operation, and improvements are needed in appliances for drawing the bread and conveying it to the packing store, although something has already been done in the latter direction. But from the time the dough is placed in the hopper of the divider until it is arranged on the "setters" to prove for the oven, the process of breadmaking may now be considered as practically automatic. There are two distinct systems now in commercial operation—that of Messrs. Werner, Pfleiderer, & Perkins, Limited, and that of Messrs. Jos. Baker & Sons, Limited. The former employ either the Universal or Viennara type of dough-mixer, the flour previously weighed and sifted, and the water measured and attemperated in the special appliances for the purpose. The dough is kept in trucks till it is ready, and is then passed in pieces into the divider; from this it is divided without handling on to the "hander-up" and then to the prover, which is a large enclosure with hanging cloth-lined trays that are carried very slowly and with an intermittent motion upwards and downwards through the prover until they reach the aperture on the opposite side, at which they are automatically turned on to a band by which they are conveyed to the moulder; after moulding, the loaves are placed on the "setters" to prove. All the machines working thus together have to be speeded so that the loaves pass along in a continuous stream without congestion. In the prover the shelves are cloth-lined, so that no dusting is needed to prevent the loaves from sticking. At an ordinary bakehouse temperature the loaves can remain long enough in the prover to mature properly, but there are many bakeries in which the temperature is too low to attain this without artificial heat. As the prover is entirely closed in, and is therefore free from draughts, the upper parts of the loaves, although uncovered, do not readily skin, even if the air is com-

Automatic Plants: Werner, Pfleiderer, & Perkins' System.

paratively dry, or only moist by the slight exhalation of vapour from the loaves themselves. But when extra heat is needed it cannot be obtained by the use of naked steam, because that, if present in any appreciable quantity, would make the loaves stick to the cloths, and would otherwise damp these and render them clammy. But there is no reason why these provers should not be fitted with some form of water or steam radiators, so that, should occasion arise, their atmosphere may be raised to and kept at any desired temperature. The intermittent movement of the shelves of the prover is to allow time for each shelf to be filled with loaves while opposite the long narrow opening that serves for this purpose. This type of prover (see the Plate) is high, and rises like a great oblong box from the floor level.

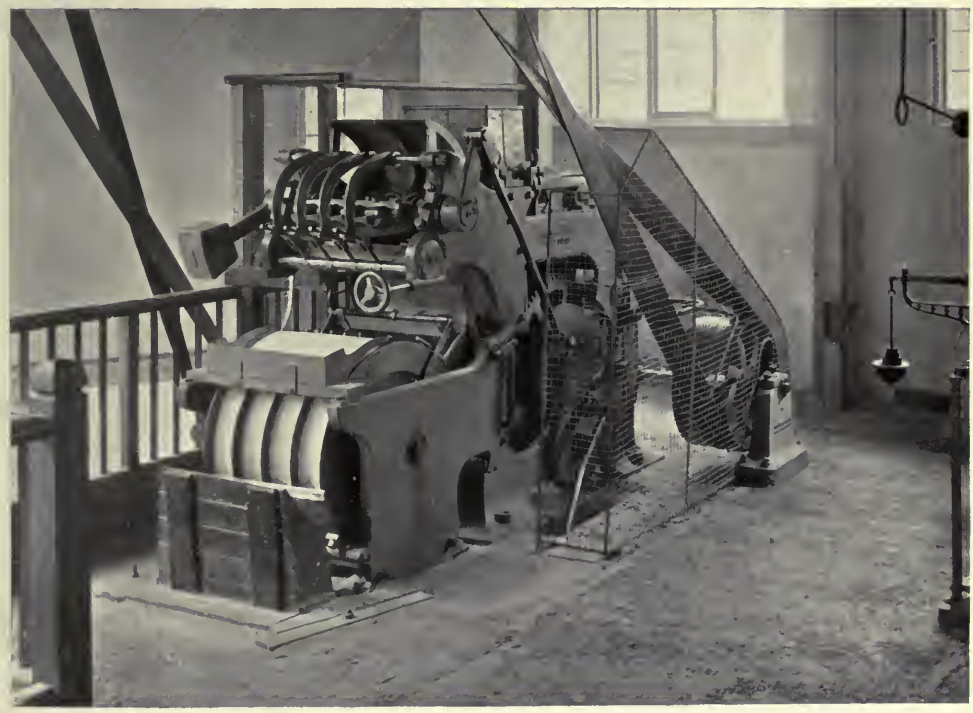
Joseph Baker & Sons' Automatic Plant.

The other system of automatic breadmaking referred to is worked on a different principle (see Plate). After the dough is made in the usual way and allowed to prove, it is passed on to the divider, to which is attached a "hander up" of the grooved-wheel pattern. The loaves leave this latter machine as round balls, and are dropped through four small chutes into the boxes of the prover, which move along underneath slowly, but in unity with the speed of the moulder. The prover in this system is quite unlike the other described. It consists of a long wide box suspended from the ceiling of the bakery, or in other convenient situation. The internal parts consist of two broad bands, the top one fitted with square open boxes or cups fixed at regular distances apart, and with a motion away from the "hander up". The cups containing the loaves are conveyed very slowly along the top of the prover, and when they reach the end of the pulley carrying the conveyor they are turned upside down, the loaves then resting on the lower band with the cups on top of them, and in this condition are carried forward, and by an ingenious device are dropped one at a time on to the Callow-Baker moulding machine, and are moulded and placed on the setters, ready for the oven after a little proof. This prover can be maintained at any desired temperature, but it is claimed by the patentees that on account of its being fixed near the ceiling of the bakery it is in the region of the warmest atmosphere, and therefore needs little attention or artificial warming.

Oven-loading Conveyors.

Reference has been made to the need for some oven-loading appliances. The writer is aware of only one such contrivance, made by Messrs. Cox & Son (see Plate). This appliance is adapted for tin bread, and is in use in a large Manchester bakery. A frame with apertures, each to hold one pan, is suspended from chains, and by an overhead rail the frame and full pans can be conveyed above the drawplate of the oven and deposited on it. The chains are detached and the frame left on the plate while the bread is baking. When the batch is ready the chains are again fixed to the overhead trolley and the whole batch carried at once to the cooling and packing room to be emptied. The whole operation of loading or unloading a plate occupies only a few minutes, and as the pans are equidistant from each other the baking is very uniform.

PROVER DELIVERING INTO CALLOW-BAKER DOUGH-MOULDING MACHINE



DIVIDER AND HANDER-UP

AUTOMATIC BREAD-MAKING PLANT

(Joseph Baker & Sons, Ltd.)

This arrangement is evidently not suitable for crusty bread, for which no automatic loading appliances have yet been designed.

The writer is aware of only two kinds of conveyors that have yet been adapted for conveying from the oven mouth to the bread room. One of these is in Feaist's Bakery in London, the other at the Apostolof Bakery, also in London. At the former the loaves as they come from the oven are packed on flat boards—the same number on each board—and these are placed on hanging shelves of a chain conveyor in continuous motion, which carries them directly to the packing room, where an attendant transfers them at once to racks ready to be packed in the vans. The other form referred to is an ordinary band conveyor in a casing with sides, and running near the ceiling. The end of this long conveyor reaches near the ovens, and can be lowered to any convenient height to receive the loaves as they come from the oven. They are removed from the plate on to a large table, then simply placed on the conveyor by hand and carried a considerable distance away to the bread room. This conveyor is very efficient. It reduces the labour in the bakery and saves space. The adoption of conveyors of some kind for carrying both bread and tins of confectionery from the front of the oven to a more convenient packing place is one of the developments likely to be witnessed in the trade in the near future; and now that electric motors are coming into such general use, even in small bakeries, there is no reason why a conveyor should not be a necessary appliance in every factory claiming to be up to date.

Conveyors for Unloading Ovens.

CHAPTER LII

CONFECTIONERY MACHINERY

The machinery applicable to confectionery manufacture is as a rule smaller and lighter than that for bread. In large factories, such machines as those for making fondant, grinding almonds, or even grinding sugar may be profitably installed; but as confectionery, except cake-making, is still, and likely to remain, unsuitable for factory operations, the machine plants in use will continue to be comparatively simple. Sponge-beating machines are invaluable, and can be used for sponge goods or for beating whites of eggs for meringue, &c. There are four distinct types of those machines on the market, any of which is quite satisfactory if handled properly. The Morton machine has series of oval grids which pass through each other. It has a circular bottom, generally of copper, and is jacketed so that it can be heated up with warm water. The Griffith machine has two sets of vertical grids. The Geddes machine has a frame consisting of circular ends with steel bands stretched between them, alternate sets working in opposite directions. The Cadisch whisk (fig. 223) is intended to work exactly like hand beating. It consists of a copper pan fixed in a ring. The whisk is a long wooden handle with a bulbed head of wire. The handle of the whisk is fixed with a pin to a movable support, and the top end turns freely in a ring connected with a spindle which has a small flywheel at its top. Cone gearing allows for using either slow or quick speed as desired. Some confectioners are specially fond of this machine, but the writer cannot see that it is more effective than the others, and it certainly needs a good deal more repairs for broken shafts, and more care in adjusting to get good work from it. Some sponge machines can be fitted with arms for cake-beating. Although great care has to be used in working with these different sets of arms alternately, to prevent the sponge mixtures, say, from being spoiled with the fat from previous cake-mixing, yet for anyone with only a small trade the double-purpose machine is a boon, saving space and expense, and giving all the efficiency desired.

Confectionery Machines.

Sponge-beating Machines.

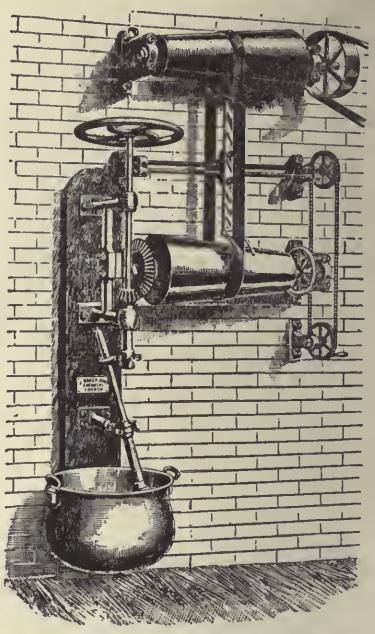


Fig. 223.—Cadisch Whisk

Cadisch Whisk.

CONVEYOR SYSTEM FOR LOADING AND UNLOADING OVENS

Of cake-making machines there is an endless variety. Like dough-making machines, those that are simplest in construction are most satisfactory. Although, as already stated, it is a convenience when the whisk and the cake-batter blades can be used alternately in one machine, it is much more satisfactory, when there is much work to do, if the cake-beating blades are fixtures. Fixed blades are more difficult to clean, but movable blades are always in danger of getting out of order through faulty adjustment. Whatever kind of cake machine is used it ought to have two-speed gearing—a slow speed to start the mixing of butter and sugar, &c., a quick speed to beat them to a cream, and a slow

Cake-making Machines.

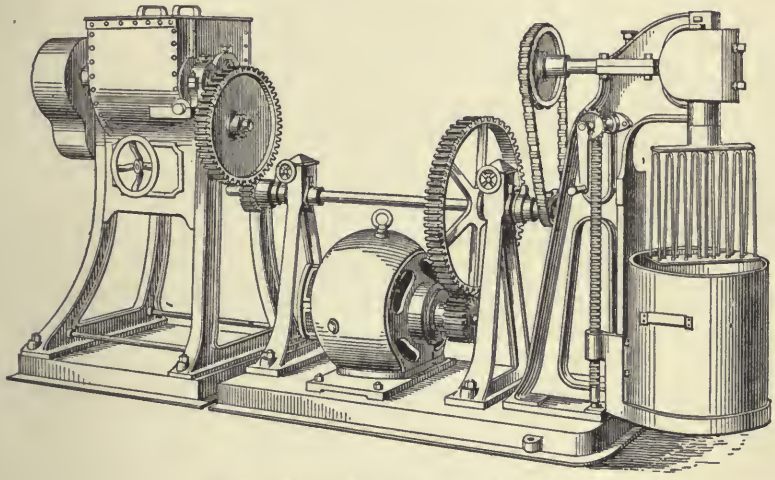


Fig. 224.—Morton's Small Cake Plant with Motor

speed again to mix the flour, fruit, &c. Some cake-bakers are afraid to mix the flour by machine, but prefer to take out the batter and mix the flour by hand. Much better texture is, however, obtained by finishing the mixture in the machine.

In addition to the usual run of machines there is one little machine, an illustration of which is given on the plate at page 432, vol. i, that is most useful to the confectioner. This is a disk cutting, grating, and slicing machine. The cost of a small one is about 35*s*. With this four disks are provided. These will prepare almond meal, shred almonds, chop almonds, or slice peel for the inside or outside of cakes, slice vegetables, make cake or bread crumbs, &c. &c. A small cake plant, as shown in fig. 224, is efficient for doing a very considerable shop trade, and quite as much as in the bread-department machinery, for the harder work of the confectioner increases his capacity many fold.

Almond Cutting, Grating, and Slicing Machine.

CHAPTER LIII

POWER—GAS AND OIL ENGINES

Machinery in the confectionery side of a bakery may be a great labour-saving agency even when it is driven by hand; but in a bread bakery, although hand machines may be cleaner than hand work, and perhaps even less exhausting, the scope of such machines is very limited, and the saving they effect cannot be very great. Happily, power is not very expensive, either with regard to the machine for its application or the material that supplies it. Gas engines are very suitable for bakers' use, because they can be obtained small enough to be cheap, and with just sufficient power for the baker's requirements; because they require little skill to work them; because the construction is so simple that there is little danger of breakdowns and much cost for repairs; and because they can be started quickly and stopped immediately the work is done, and at a very small cost for gas or oil, with practically no waste. For a two-sack machine of any type a gas engine of four horse-power nominal is sufficient to supply the necessary power, while one of the drum machines of the same capacity may obtain sufficient power from an engine of two horse-power. The gas supply to the engine is received from the main into a cast-iron casing, with a sheet of indiarubber for the back. When this casing, or bag as it is called, is full of gas, the distended rubber automatically shuts off the gas supply, and admits gas again when some is drawn into the engine. The piston of the engine, to which uniform motion is conveyed by the connection with the flywheel, acts as a pump at the first part of its outward stroke, drawing in to the cylinder a mixture of gas and air; then, as the flywheel pushes the piston back it compresses the gas mixture in the cylinder, and a small quantity of gas passes through a small aperture into what is called the combustion tube. This is a porcelain tube surrounded by the flame of a Bunsen burner and maintained at a bright-red heat. As soon as some of the gas enters this ignition tube it is ignited and explodes the whole of the compressed gas and air in the cylinder, thus exerting a great pressure on the piston, which in turn is conveyed to the flywheel, which acts as a sort of reservoir of energy, paying it out as work again at a uniform rate. As the explosions in the cylinder produce a great deal of heat, it is jacketed and connected with a large cistern of cold water, which provides for the circulation of cold water round the cylinder while it is working.

Gas Engines in the Bakery.

The cycle of actions in producing the power in a gas or oil engine are: (1) the piston draws in a mixture of gas and air at its outward stroke; (2) the return stroke compresses this mixture with a pressure of about 40 atmospheres; (3) the mixture is ignited and explodes, and the impact projects the piston forward; (4) the return

Action of the Gas Engine.

stroke of the piston removes the residual products of the explosion from the cylinder. All these movements are properly regulated by valves, which are geared to work automatically. The governor of the engine, which prevents its reaching too high a speed, consists of two balls with a weight on top. The rod carrying these balls has a collar on it fitted in a sleeve, which is connected with a small rod carrying a crosspiece which acts as a bridge between the gas supply and the valve allowing entrance to the cylinder. This governor does not regulate the gas supply, but cuts it off completely whenever the engine runs at a speed higher than that for which the governor has been set. When the speed becomes too high the balls of the governor are thrown outwards and the small crosspiece is lifted up, so that the gas valve and the opening to the cylinder are not connected, and no gas enters until the speed is reduced to the normal again and a fresh charge of gas is admitted.

In the instructions for working the engine a position is shown to which the pointer of the gas tap has to be turned to admit a larger charge of gas than is required after the engine is running; but as all gas is not of the same composition, the best explosive mixture does not always require quite the same proportion of gas to air, and in consequence the point on the disk to show where the pointer should be, has sometimes to be varied from that shown by the makers of the engine. This, however, must be determined first by experiment, and may vary considerably for different localities. The engine is started with the exhaust partly open. When the engine is to be started, care should be taken that the lubricators are all in order and filled with oil. The lever to open the exhaust should be pushed towards the flywheel when the machine is being stopped at last time of working. The ignition tube has to be lighted about ten minutes before it is required. The gas supply is turned on, the flywheel turned once backwards, then forward as many times as necessary until the first explosion takes place. The connecting piece between the gas valve and the valve to the cylinder has to be fixed in position, so that a supply of gas is admitted at every stroke until speed is obtained; then the governors automatically regulate it afterwards. When about to stop the engine, see that the driving belt is on the loose pulley; turn off the gas supply, and push forward the lever opening the exhaust. With care and very little practice, gas engines can be made to run very safely and regularly.

Working of the Gas Engine.

Oil engines are serviceable for power supply in bakeries in country districts where there is no gas supply, or where the gas is very dear, and they are quite efficient and economical. The sort of engines suitable for bakery use are those burning ordinary commercial petroleum and lamp oils. These oils are less dangerous in use than gasoline or light petroleum, as they do not give off inflammable gases until a temperature from 86° F. to 120° F. has been reached. The explosive mixture in this case consists of the vapour of the oil mixed with a definite quantity of air. The method of utilizing the force of the explosion is

Oil Engines.

not very different from the arrangement in a gas engine, but in oil engines an additional appliance is needed to produce the oil vapour from the liquid. In different types of engines the method of doing this varies considerably. In the Brayton engine the gases are burned under pressure. It has two cylinders, one for the compression of the mixture, the other the working cylinder. In the course of the compressed air a space is formed in which are packed absorbent materials, such as hemp and felt, and a special pump is provided to keep them constantly soaked with the oil. The oil carried by the porous mass of felt is blown into foam by means of a jet of compressed air. In the passage through the felt the air becomes charged with a cloud of oil globules in a condition suitable for combustion in the cylinder of the engine. During the first third of the stroke the mixture of air and oil in an atomized condition is admitted to the working cylinder, and after the firing of the charge the piston is driven to the end of its stroke by the expansion of the gases. Exhaust of the waste products takes place throughout the return stroke, and as the Brayton engine is double-acting, a similar series of operations takes place on the other side of the piston. In nearly all types of oil engines the heating arrangements for firing the charge are quite different from those adopted for gas engines. In some cases an electric spark is used, but as a rule the heat is supplied by the residual heat from the explosions in the cylinder keeping the igniter at a sufficiently high temperature, although it has to be heated up from outside sources at the start.

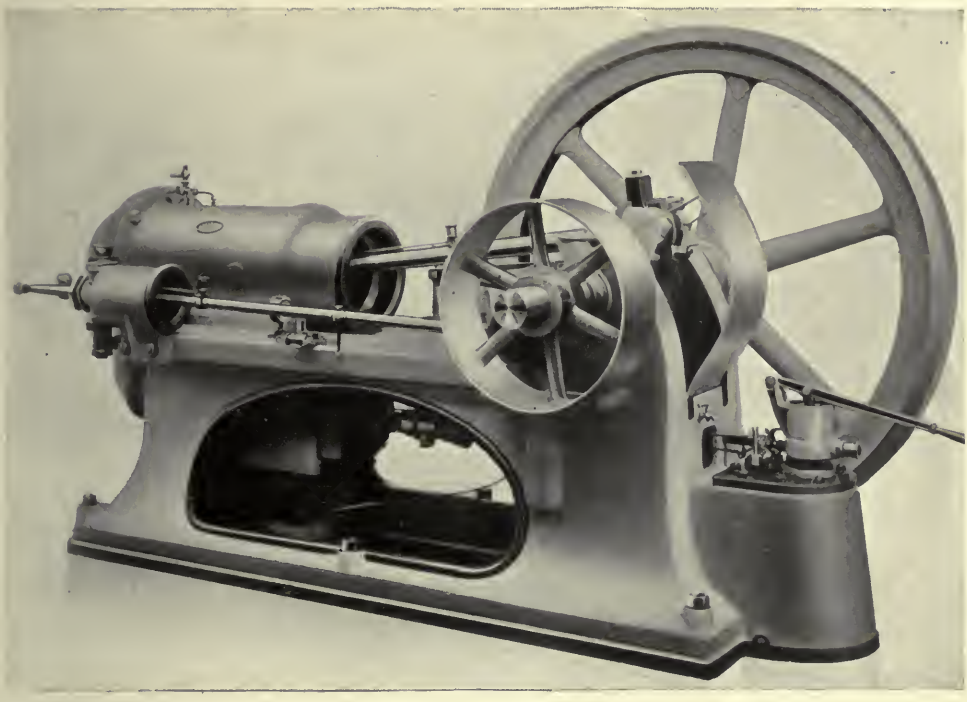
Ignition Methods.

In the Hornsby engine any commercial oil can be used. The base of the engine is made to serve for the oil supply. A special portable oil lamp at the end of the cylinder serves to heat the vaporizer when starting the engine, and about ten minutes are required with the oil flame to produce the necessary temperature; then, when the engine is working, the residual heat keeps up the temperature and the lamp can be extinguished. The vaporizer is connected to the cylinder by a small pipe, through which the air in the cylinder compressed during the return stroke of the piston is driven; the chamber is thus filled with compressed air. Towards the end of the same stroke the exact quantity of oil required to form an explosive mixture is injected into the chamber by means of a pump. Rapid and complete vaporization of the oil takes place as soon as it is injected into the compressed air, and the mixture in contact with the heated walls of the chamber immediately explodes.

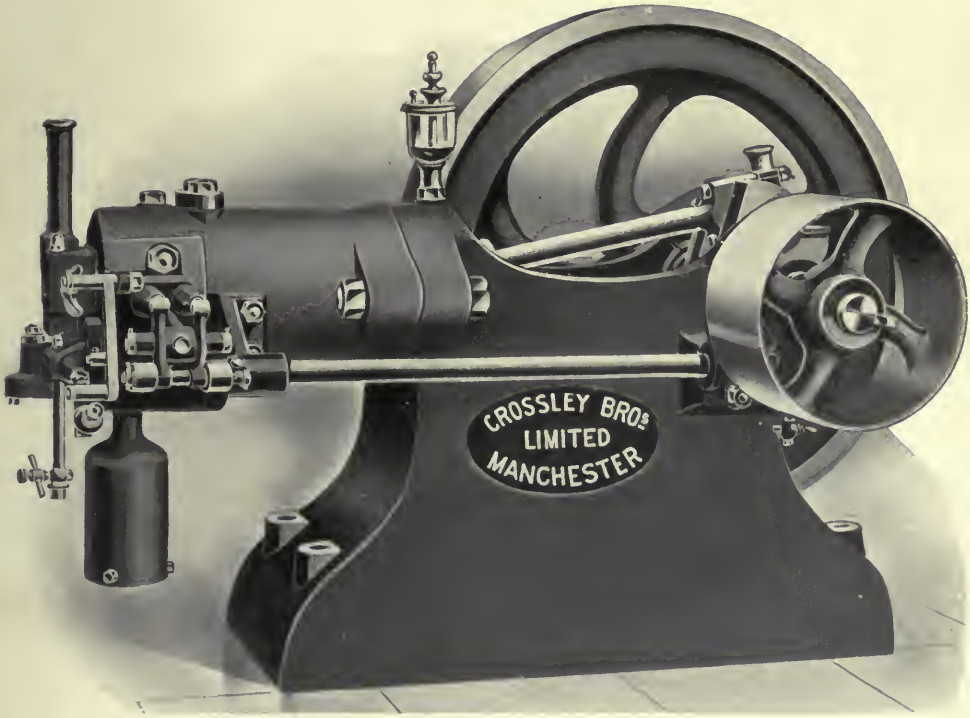
The Hornsby Oil Engine.

The Crossley oil engine in appearance very much resembles the gas engine made by the same firm. It has, however, a special type of vaporizer, which enables a combustible mixture of air and oil vapour to be used instead of coal gas. The vaporizer consists of a chamber divided by vertical walls into four canals; through these a lamp flame passes to the chimney at top, whilst encircling the lamp chimney is a spiral passage through which a stream of air is forced. This heated air afterwards comes in contact with the oil, a portion of which is

The Crossley Oil Engine.



PRIESTMAN OIL ENGINE



CROSSLEY HORIZONTAL GAS ENGINE

entrained and carried over, and an explosive mixture enters the cylinder. There are about as many types of oil as of gas engines. When the men become familiar with their working they give little trouble, but they need more care and cleaning than gas engines.

The following are the general prices for gas engines of small size of the best type:—

1	horse-power	nominal—	about	£44.
2	,,	,,	,,	48.
3	,,	,,	,,	54.
4¼	,,	,,	,,	61.
5½	,,	,,	,,	68.
8½	,,	,,	,,	79.
11	,,	,,	,,	89.

Oil engines of the same power cost about £10 more for sizes up to 3 horse-power, and about £20 more for the larger sizes. These prices are subject to discount of 10 per cent to 15 per cent.

CHAPTER LIV

ELECTRIC MOTORS

In modern bakeries of small and moderate size the electrically-driven motor occupies a prominent position. In comparison with other methods of power supply, the following claims may be advanced in support of electrical machinery:—

Advantages of Electrical Power.

1. The space occupied by the motor (it being understood that only small machines are under consideration) is less than that occupied by other types of machines of equal power.

2. They are accompanied by less dirt and noise.

3. There is less power lost in friction in the machine, this gain being more pronounced the larger the machine.

4. They can be started without any previous preparation, and stopped with similar ease.

5. The speed is capable of easy regulation within the limits of the machine.

Supposing that it is decided to lay down such plant, the choice of the particular type of machine is in the majority of cases determined by the nature of the current supply in the locality. The current may be direct (or continuous), or it may be alternating; and, if the latter, it may be available in what is known as single-phase or polyphase form. It is then necessary to ascertain first what variety of supply is obtainable, and also at what pressure such supply is maintained. Having acquired this information, the purchase of a suitable machine is the next point for consideration. The cost of the actual motor does not represent the total outlay by any means; account must be taken of the necessary auxiliary appliances and also of the cost of wiring. As regards the machine alone, continuous-current motors and single-phase alternating-current motors do not differ much in cost; but for any given power polyphase motors are cheaper than either of the above. The table on p. 339 shows the list prices (taken from a catalogue of a well-known firm) of continuous-current motors of such power as would be necessary for small establishments. In each case the price is that of the machine alone, the cost of starter, wiring, &c., not being included. This is dealt with later. From these prices a substantial discount could no doubt be obtained. They may be taken as an average quotation. Motors can be obtained at a lower figure; but a too rigid economy in prime outlay is not to be recommended.

Considerations Affecting Choice of Machine.

It will be seen from the table that the price of a machine of any given power rises rapidly with the reduction of stated speed, the slow-speed machine being altogether more massive than the high-speed. A high-speed machine could be used, reducing the speed by some form of gearing at some loss of power in the process. The smallest of the above

PRICES OF CONTINUOUS-CURRENT MOTORS

Horse-power.	Revolutions per Minute.	Price (motor alone).
		£ s. d.
3	1950	17 5 0
3	400	47 5 0
3	265	53 5 0
3½	1050	26 5 0
4	480	47 5 0
5	1550	26 5 0
5	1050	33 15 0
7	1400	33 15 0
7	1000	41 5 0

machines could be easily accommodated in a space 3 ft. square, and the largest in a space 4 ft. 6 in. square. The price of the starter for the above would vary with the machine, depending on the power and on the current taken; it would run from about £1, 10*s.* to £3, 5*s.* over the above range. A fairly good rule is to allow 10*s.* per horse-power. In the case of alternating-current motors, although, as stated, the cost of the machine itself might be less, yet where a starter is required such starter would cost considerably more than that for a continuous-current motor. Allowance must be made, too, for the cost of wiring. This item in the case of the smallest motors would amount (exclusive of the cost of the starter) to about £3, 10*s.* to £4. With the larger sizes, taking heavier currents, heavier cable would be necessary, and this would increase the cost, but not by any means to an extent proportional to the power of the motor. The cost of wiring bears its largest ratio to the cost of the machine with small sizes. But in any case the particular circumstances must be known (situation of machine, length of run of cable required, &c.) to estimate this portion of the cost. As a guide to the size of the plant required in any particular shop, the following table may be found useful. It gives the approximate power required for kneading machines of various capacities.

Cost of Motors and Starters.

Size of Plant Needed.

Capacity.	Approximate Horse-power.	Capacity.	Approximate Horse-power.
½ sack	1–1½	2 sacks	4
1 „	1½–2	3 „	5–6
1½ „	3	4 „	6–7

A small calculation will show how to estimate roughly the cost of

current supply. If the machine has its own voltmeter and ammeter, these readings can easily be taken. Then

$$\frac{\text{Volts} \times \text{amperes} \times \text{hours}}{1000} = \text{Board of Trade Units.}$$

Estimating from the known horse-power of the machine,

1 horse-power for 1 hour = ·746 Board of Trade Unit,
and therefore ·746 × H.P. × hours = Board of Trade Units.

Knowing the cost per unit, the total cost can readily be estimated.

Types of Continuous-current Motors.

Continuous-current motors may be of various types, according to the method of winding. If the same current traverses the armature and magnet windings, the machine is known as a "series" motor (fig. 225); but if the main current traverses the armature, and a branch circuit is led off to the magnets, the machine is a "shunt" motor (fig. 226). A third type combining these two gives

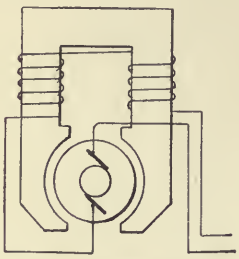


Fig. 225.—Diagram of Series Winding

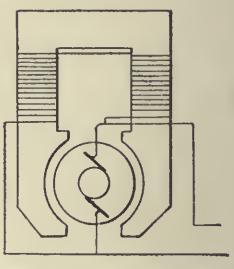
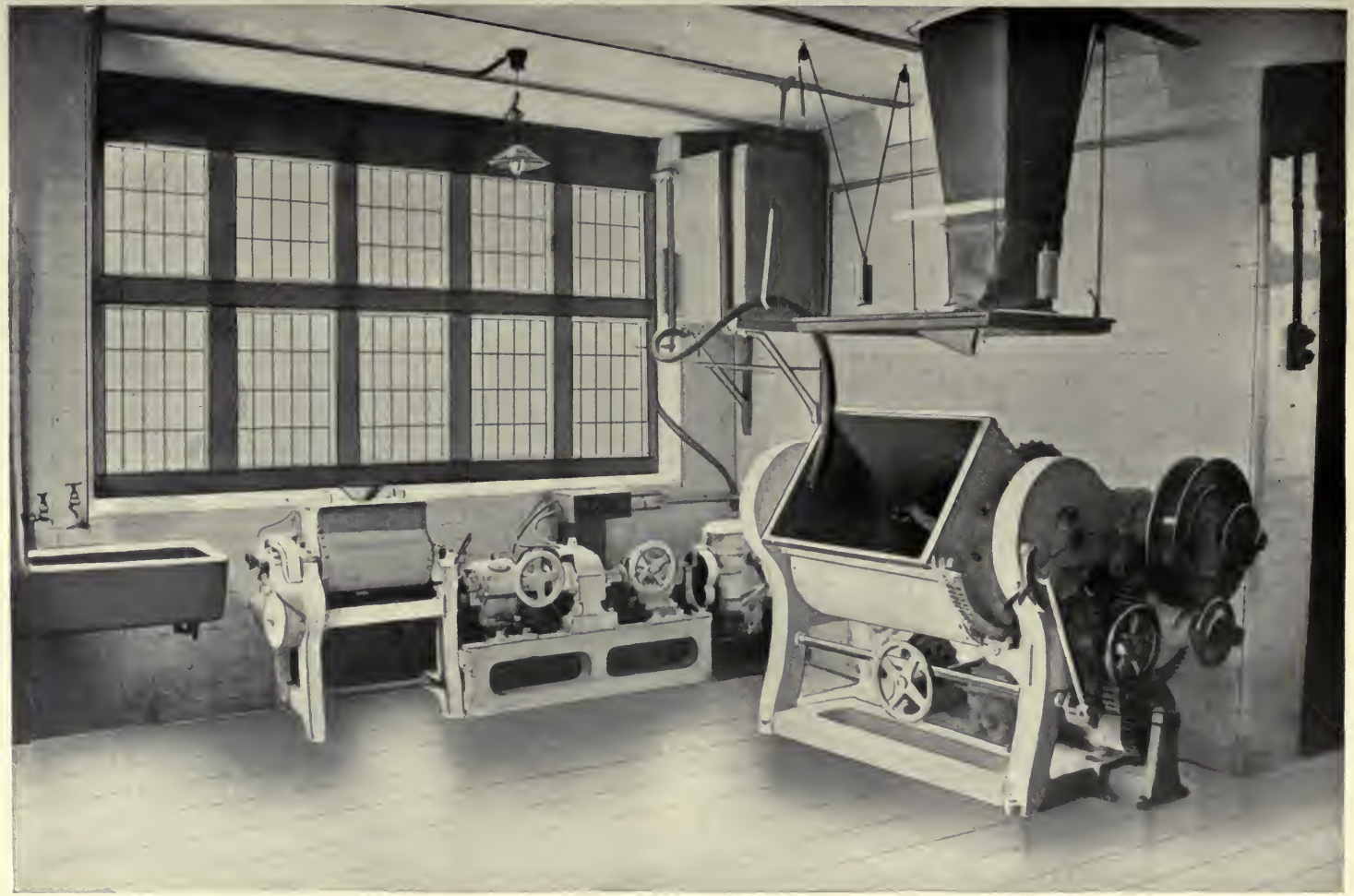


Fig. 226.—Diagram of Shunt Winding

the "compound motor". Each has its advantages and disadvantages, rendering it adaptable to some kinds of work and inadvisable for others. For instance, the shunt motor is best when a constant speed is required at different loads; and the series motor where great starting power is required, as in crane motors, &c. For bakery purposes the shunt motor would seem to be the better adapted on the whole.

Position of Motor.

The position to be occupied by the motor should then be chosen. This should be in a clean, dry place as free as possible from dust. This latter qualification may be difficult of attainment, but can be provided for by adopting a machine of the "enclosed" type, in which the running parts of the machine are, as the name implies, defended to a very great extent from the intrusion of small particles. The foundation of the machine should be quite level, and it may either be bolted down or mounted on slide rails. If, as is most probable, the power is to be transmitted by belting to a shaft, the adoption of slide rails allows for a slight alteration of the position, if necessary, to get the belt running to the best advantage.



CAKE AND BREAD MACHINES DRIVEN BY ELECTRIC MOTOR

Before starting the machine, see that the brushes are bearing properly on the commutator. Most machines are now fitted with carbon brushes, and several will probably be found in each holder. The brushes in the several holders should be arranged so that between them they bear on the whole width of the commutator. If this is not so, after running for some time those parts on which the brushes bear tend to become ploughed out, while the intervening surface remains intact; thus giving rise to grooves in the commutator, and leading to trouble later on. The brushes in the several holders should therefore not be in line with one another around the circumference of the commutator. Their bearing on the commutator surface can be rendered certain by hand-turning the machine with a piece of fine glass paper (not emery) beneath the brushes so that the glass paper may render them of the same slight curvature as the surface on which they bear. When satisfactory, remove all dust with brush and bellows. See that the oil wells are filled. The machine is then ready to start. The main switch of the machine is first closed, and the actual starting effected through some form of starting resistance.

Starting the Motor.

Fig. 227.—Motor Starter

For a continuous-current machine a typical starter is shown in fig. 227. It is to all intents and purposes a set of coils of heavy wire in series with the armature of the machine, which are at first in circuit and are then gradually cut out. The main switch being closed, the starting lever is moved on to the first stud. At this point a large current traverses the armature of the machine, and it commences to revolve. For the time being the machine may be regarded as a "generator", *i.e.* a machine to which motion is supplied resulting in the production of current. The current set up by this generator action tends to flow in the opposite direction to that sent into the machine from the mains, and so diminishes the current in the circuit. The voltage set up by the machine, in so far as it acts as a generator, opposes the voltage applied to the machine from elsewhere; and this opposing voltage is referred to as the "back electromotive force" or "back E.M.F." of the machine. Hence the current is diminished; the machine, in fact, could not stand for any length of time the current which passes through it at the instant of starting before the rise of the back E.M.F. This opposing force must be given a short time to develop as the machine speeds up, and hence the starting lever must be

moved very slowly stud by stud to its final position. The motion must at any rate be very slow at first, while as the machine runs up to speed the later studs may be passed at a somewhat quicker rate. On reaching the last stud the lever is, as a rule, held in position by a small electromagnet. If a failure of current occurs from any cause, the electromagnet is demagnetized, and the starting lever flies back to its original position by the action of a coiled spring. The motor being started, the speed can be adjusted as required by means of the regulating resistance, which would be found on the starting panel. This regulator consists of a series of coils by which the current passing through the field magnets can be increased or decreased as desired. With a shunt motor a decrease of the field current increases the speed, and vice versa.

Adjustment of Speed.

A motor, when newly put into work, will require some attention at first until it settles down. Small details must be looked after, and the machine may develop minor faults. Of the smaller faults a machine may exhibit, perhaps the most prominent is that of sparking at the brushes. This can, as a rule, be reduced to a very small amount, if not abolished entirely, the degree of success depending on the cause from which the sparking arises. A very frequent cause is a wrong adjustment of the brushes, either as regards their position on the circumference of the commutator or as regards the contact they make with the commutator bars. If from the first cause, the obvious remedy will be to alter slightly the position of the brush rocker. This can be done while the machine is running. It will be found that on moving the brushes round the commutator in one direction the sparking increases, and in the other direction it decreases. A position can be found, if this is the most conspicuous cause of sparking, where it can be reduced to a minimum. The angle through which the brushes are moved must not in any case be very large, as a shifting of the brushes through an angle equal to the pole pitch has the effect of reversing the direction of rotation of the machine. This angle is found by dividing 360 degrees by the number of pole pieces on the field magnets. It may happen that any noticeable amount of sparking only occurs at one set of brushes, and that on moving the brush rocker sparking at this set ceases and appears at another set. In this case it is not so much that the rocker position is wrong, as that the relative position of the brushes is incorrect, *i.e.* the various sets are not separated by the correct angle. This can easily be detected by a simple measurement, though in modern machines fitted with carbon brushes the construction of the machine is such as almost to preclude its possibility. The brushes in any one holder should, however, be adjusted so as to bear on the commutator in line with one another, error in this respect leading to sparking at the brush which is out of line when the remainder are running smoothly. If an alteration, either of the rocker, one set of brushes, or an individual brush, does not reduce the sparking, another cause must be sought. Roughness, either of the commutator or brush surface, will produce it, as such a cause means

Sparking at the Brushes.

constant bad contact of brushes and commutator. Brushes should be ground in when fitted to the machine as mentioned above, and examined periodically to see if they continue to bear properly. Carbon brushes should not be allowed to wear down at one edge and not bear on the whole surface. Roughness of the commutator may be caused by the ploughing action of the brushes causing grooves to appear after running a considerable time; or by the fact of the insulating material between the bars being harder than the bars themselves, and thus being left projecting when the copper is worn down. In either case sparking will occur, and will be accompanied with some amount of rattling of the brushes. The grooving action may be avoided by the means mentioned above. The only cure for projecting insulation, if it occurs, is to take a fine cut off the commutator. This is a matter, however, which will entail outside assistance and cannot be cured on the spot. Various other causes may give rise to sparking, but they are as a rule not of such a nature as to be capable of simple or immediate remedy.

Another trouble which may arise is a refusal of the motor to start when apparently all is in order. The absence of a necessary fuse may explain it, but this would be readily detected on examination. The source of failure may be a breakdown at the local generating station, and it may be necessary for a time to cut out a certain district (a proceeding in which supply companies sometimes indulge). Against this one is powerless, and can only await a resumption of supply. A breakdown in the plant itself is frequently difficult to locate, and not always capable of rapid remedy even when located. A wrong connection may account for it; this would be detected at the first attempted run, and would not occur afterwards unless the machine had been tampered with. The various terminals of the machine being determined, care should be taken that they are properly connected to the particular type of starter in use, and also that the plant is properly connected to the positive and negative terminals of the supply mains. The terminals of a starter are usually marked L, F, A (line, field, and armature, respectively); the connections should then be made to the starter in accordance with the marks. Where not marked, the "field" terminal, at any rate, may be identified by its smaller size or from its being fitted with a smaller "thimble" for the cable. If the machine has previously run satisfactorily, this cause is practically ruled out. A break may have occurred in one of the coils of the starter. This can be determined by carefully moving the lever over the first few studs, when, if one of these is broken, the motor will start after passing the broken coil. Great care should be taken in making this trial, and it should never be continued beyond the first two or three studs, although it would detect the fault beyond this. If the broken coil is one of the later ones and the process is continued, the motor on starting would take a very large current, and this sudden rush might cause a burn-out of the armature. If a break in one of the later coils is suspected the starter might be examined, and if such a break is

Failure to Start.

found it may be short-circuited by a short piece of stout wire similar to that of the other coils. A wrong connection of the field coils, so that they oppose each other in action, may occur. This can be detected by testing the poles of the machine with a compass needle, and, if in error, altering the connections to suit the particular case. A break in the internal arrangement of the machine would, of course, entail a refusal to start, and this is a matter for special treatment and cannot be remedied on the spot.

No part of the machine should at any time during several hours' run become more than just hand-warm. It is as well to try various parts occasionally to see if this is so. If heating occurs, it is an advantage to know which part heats first, as the other parts of the machine are liable to get hot by mere conduction. Heating of coils almost always means excessive current through them, and this should be at once decreased. For instance, in a shunt motor whose field coils heat, the shunt current is too great and can be reduced by the regulator, entailing an alteration of speed. A coil remaining perfectly cold while the others are warm is short-circuited, and this fault may be at the same time the cause of the heating of the remaining coils.

Excessive Heating of Parts.

Trouble will at times arise even with the best-managed plant, but with care no serious difficulty should arise within a reasonable life of the machine. Wherever a current supply is available, electric motors represent for bakery purposes without doubt the most desirable form of power supply on hygienic as well as other grounds, and the installation of such plant cannot fail to prove its value within a comparatively short period.